THE UNIVERSITY OF HONG KONG

MODELING THE LAND PRICE IN CHINESE MAINLAND: A CASE STUDY IN SHANGHAI

A DISSERTATION SUBMITTED TO

THE FACULTY OF ARCHITECHTURE

IN CANDIDACY FOR THE DEGREE OF

BACHELOR OF SCIENCE IN SURVEYING

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION

BY

LAU WAI LEE WILLEY

HONG KONG

APRIL 2010

Declaration

I declare that this dissertation represents my own work, except where due acknowledgment is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signed: _____

Name: _____

Date: _____

Abstract

Land price behavior is always one of the major study areas in land economics. Land price is one of the important indicators of resources allocation that will affect planning and use of land within the region.

This study is aimed at investigating the attributes of land prices in Shanghai using a pricing model with empirical data over the period of 1992-2006. Accommodation value (land price divided by gross floor area) is used as dependent variable. Independent variables are identified by considering the interaction between land market, property market and the local economy.

The dependent variable is regressed against factors representing the demand-side and supply-side of the land market with different time lags on land prices. The empirical result suggests that population density, GDP and people's income are the major factors affecting land prices in Shanghai. In the model, land use dummy and location dummy are added to investigate the effect of land use and location on land prices. It is found that only residential and industrial land uses are significant to land price change, however they possess different signs and effects on land price.

To conclude, the result reveals that land price in Shanghai, under a planned economy in a socialist country does possess characteristic of a market economy in a capitalist country where major land economics theories are developed. However, Shanghai does possess certain degree of planned economy characteristic which make market economy factors not the only driver for land price. This finding is useful for future academic researchers to develop land price theory that is unique in the mainland China.

Acknowledgements

The author would like to take this opportunity to express his deepest gratitude to my supervisor, Dr. L. H. Li, for his invaluable guidance and support on my research. Without his unfailing guidance and insightful advice I would not have attained the knowledge for academic research and finish this study.

I would also want to show special thanks to my father for his endless support and care throughout my study in the University and my life.

Table of Content

List of Figures

List of Tables

Chapter 1 Introduction

Since the late 1978, China government initiated the Reform and Opening-up Programme to improve the efficiency and productivity of the economic sector and to raise the very low living standards of the country's citizens. (J. Albert Cao, 2008)

After the policy was implemented, there was an average annual growth rate of 9.8 percent for the last 3 decades. China's economy in nominal gross domestic product (GDP) terms has risen from the tenth largest in the world in 1978 to the fourth largest in 2005 and has become the third largest in 2008 eventually became first in 2010. Such a growth record has made the Chinese economy the fastest growing one among major economies in the world.

Shanghai, which is one of the most important cities in China, has contributed a lot towards the success of China's economy today. It is often regarded as the centre of finance and trade in mainland China. Modern development began with the economic reform in 1992, a decade later than many of the Southern Chinese provinces, but since

then Shanghai quickly overlook those provinces and maintained its role as the business center in mainland China. Today, Shanghai also hosts the largest stock trading market in mainland China.

Due to fact that land is always regarded as an important factor of production, it should possess certain market mechanism characteristics, yet China is a socialist country and all the economic resources are controlled by the central government directly. This creates a question that whether the land in China does possess this market characteristic and is driven by the market force in determining its value and economic position.

Based on the study produced by previous scholars and academic papers in relation to the privatization of urban land in China, it could be seen that a new market mechanism of the combing of Socialist doctrines and a market driven by capitalist land use and land price principles could exist in mainland China. Moving this further, the question is whether land price in China really follows the market or not, and how similar or different is the land price in China compared with the markets in other

capitalist countries for example Great Britain and United States.

In this dissertation, Shanghai is selected as the subject to be studied. The trend of the Shanghai land price is examined, to see how correlated is the land price of Shanghai and the market force, which is defined as the supply and demand of the land and other economic related parameter such as GDP, employment rate, investment.

1.1 Importance of Study

Whenever human beings carry out trading activities, land is consumed either for production or as a media for trade, although new technology such as the internet allows traders to trade in a virtual platform and conduct their economic activity, in so far this could never replace the importance of land in the economy. Therefore it is very important to understand the land market mechanism, particularly land price behavior. In order to do so, it is necessary to understand the land price attributes that would affect the land price behavior.

Unlike traditional market economy, China possess characteristic of a transitional economy where property rights and land use rights are

always major problems for land owners to deal with. It is rather important to study and understand whether land prices in China are actually influenced by factors that general market economy would regard as important. Such a study may help politicians, planners, economists and landowners to forge a better land use plan for the whole economy.

Second, potential for the development of real estate market in developing countries is important and would contribute much to the country's economic growth in future. Walker, Chau and Lai (1995) showed that the contribution of the property and construction sectors to GDP in Hong Kong averaged over 24% since 1980, which was greater than any sector of economy including manufacturing at that time, In China, the importance of land assets and property development is gaining greater attention in the whole economy. In the meantime, it has been widely accepted by Chinese officials as well as academic researchers that the real estate and construction industry is one of the pillars of the national economy and therefore attention should be placed on such field.

Thirdly, a competitive land market is important for the fiscal budget and urbanization of the country to maintain a constant growth in economic development. It is the government's job to maintain and improve the infrastructure and investment environment for the whole country. Without a good understanding in land price behavior, planning from the government may be a waste of resources as the best use of the land may not be utilized in its planning. On the other hand, it is a common practice for the authorities to invest in land development using the income from the land sale, but this is only workable when the income obtained in land from the land sale is sufficient to cover the costs of infrastructure construction, in other words, properly priced land. Thus it is important to understand land price composition for many fundamental needs in the modern economy.

1.2 Objective

1. To analyze the reasons behind the enhancement of land prices in Shanghai;
2. To set up a model explaining the changes in land prices in Shanghai;
3. To examine the relationship between land prices and variables such as population, land use and economic climate.

1.3 Structure of the Dissertation

The objective of this dissertation is to construct a land price model through regression analysis to determine the land price attributes in Shanghai. In this study, accommodation value[1] is the dependent variable and certain economic and financial factors such as GDP and unemployment rate are used as the independent variables. The model utilizes annual land sale data from 1992 to 2006. Significant variables will be analyzed and investigated in detail on its effect on land prices. Conclusion and limitations on the findings will be drawn at the end of the study.

This study is divided into seven chapters. Chapter 1 is the introduction. It describes the background, objectives and framework of this study.

Chapter 2 provides a brief summary of Chinese land use system and land use right. History of the development of Chinese transitional economy and a review on the uniqueness of China's economy is given.

[1] Accommodation Value is equal to land price divided by gross floor area.

Chapter 3 provides a review on the literature on land price theories which includes traditional land price behavior and contemporary land price determination. A summary on the past literature is also provided.

Chapter 4 provides an overview on the methodology used in this study. The regression analysis is described and the general development process of the land price model is also outlined.

Chapter 5 provides an overview in the empirical model employed in this study. Explanatory variables to be tested are justified and identified. Their expected effects are also examined and data used in the analysis are specified

Chapter 6 provides the analysis on the empirical result of the findings. Implications of the findings are illustrated

Chapter 7 provides the conclusion of the study. Summary and the limitations of this study are given and further research area will also be suggested.

Chapter 2 Review of Chinese Land Use System and Land Use Right

This chapter is aimed to provide a brief introduction on the history of Chinese Land Use System and Land Use Right in China. This chapter is modified according to the translation work done by Zhang (2001) which is based on the framework of history given by Xu, M and Zhang, X.H. (ed.) (1995).

After China had transformed into a socialist country in the 1949 revolution, private property rights has been transferred to the state. Market power was totally eliminated and tangible assets like lands and properties were confiscated and considered as state-owned properties with a relatively small proportion of collective-owned.

China was then developed into a socialist economy by the new government that based on self-reliance to its internal resources through administrative means. At that time people received equal amount of payment and equal amount of rights for their production contributed towards the whole economy. Since the central government

wanted to strengthen its power and authority towards the country as a whole at that time, most resources were given to stabilize the society through political issue, while only few resources are given to economic development. This resulted in a high transaction and transformation cost and enormous waste, there was growing discontent with the system, especially in the rural area. As a result, this had created a lot of problems and people in China were not given sufficient resources to support their livings. Standard of living was very low and resources allocation was insufficient. Other problems for example, distorted pricing system, over expenditure on heavy industry, stagnation in agricultural production and isolation from international trading also existed at that time.

Only until late 1960s, when Chinese leaders started to recognize the importance of the development in technology to support their county. At that time, China's country production remanded at a quite low level when compared to other surrounding Asia Pacific countries.

In late 1970s, Deng Xiaoping, the former leader of the Communist Party of China started a reformation in China, which led China form a socialist economy to a market economy. In December 1978, leaders in China agreed to focus more on economic development. The principal task of the party was to develop the productive capacity of the population and transform China into a stronger country in terms of economic influence towards the world. Country's production and economic strength had since then become stronger. Figures shown on the annual reports published by the government statistical department was showing a very strong increase in GDP and other economic indicator. Yet there was no common views on the velocity and nature of reform, it is like changing the pot holding the medicine but not changing the medicine in it. After then, economist discovered that there must be some sort of economic revolution in China to make up the gaps between its transformation of a socialist market to an economy market or in what people called as a "capitalist market with China's unique characteristic".

Conservatives however favored to keep the central role of planning in the economic reform, whereas the more radical elements pursued a complete diminish and reformed role for planning. In order to maintain the stability of the society at that time, the reforms adopted were experimental and partial and only are implemented in areas where the economy was poor and was consider far from the central government core region.

In the spring of 1992, Deng made a tour to the southern part of China, visiting Guangzhou, Shenzhen, Zhuihai and Shanghai. The purpose was to reassert Deng's proposed economic policy after his retirement. He made speeches to stress the importance of economic construction in China, and criticized those who were against further economic and openness reforms. He also had instrumented the opening of Shanghai's Pudong New Area, marking the city as China's economic centre. Since that time, market mechanism has been more extensively introduced throughout the economy. Policy and regulation on facilitating such economical movement were made. Taxation and budgetary reforms, legal and regulatory measures was use to strengthen the role of the

central bank and measures were used to improve the operation of capital and foreign exchange markets.

In the mid-1980s, the role of the market was elevated after the goal of the establishment of a “socialist planned commodity economy”. By then, China was considered to be in a primitive stage of socialism in which the commodity economy was an essential part. It was the objective of the reform to establish an economic system that combines central planning with the use of market forces.

According to Zhang (2001), the economic transition in China can be viewed in roughly in the following phases,

Phase I (1978-1984)

During this period of time, the policies in China placed greater emphasis on material incentives and a more important role for the market was created. In particular, procurement prices of agricultural products were increased, the diversification and specialization of crops were encouraged; restrictions on rural markets were relaxed. Family

Responsibility System was implemented in agriculture which decentralized the organization of farming form the collective to the household level. On the other hand, in industrial sector, bonus system was permitted and experimentation began on profit retention by state-owned enterprises. In foreign economic relations, preferential policies were conferred on special economic zones with the aim of attracting foreign investment and technology, promoting exports and having them act as laboratories for bolder market-oriented reforms.

Phase II (1984-1988)

During this phase a wide range of measures to reform the urban industrial sector was adopted by the PRC authority. These measures includes the establishment of a two-track pricing system; introduction of enterprise taxation; reformation of the wage system to establish a closer link between remuneration and productivity; and the breakup of the one bank system leading to the establishment of a central bank. On the other hand, the investment system was reformed to encourage enterprises to borrow money from the banking system to finance projects rather than relying on the government as in the past. The

revenue-sharing system between the central and local government was revised to allow for greater retention of revenue by the latter.

To attract more capital and hi-technology investment, 14 major cities in the coastal areas were designated as “Open Cities.” They were allowed for foreign trade and investment. In 1986, many of these measures were revised and expanded both in terms of jurisdiction and the depth and diversity of reform measures, such as establishing swap centers for the trading of retained foreign exchange earnings, decentralizing foreign trade by allowing local trade organizations to trade on import and export goods, and adopting a contract responsibility system for enterprises to stimulate incentives of the management personals

Phase III (1988-1991)

This period represents a period of retrenchment. The reform successfully brought an increase in demand and production, this caused a rising inflation. In early 1988, the annual inflation rate reached double-digit levels. The price controls were re-centralized under a “rectification program,” during which the authorities took strong

measures to cool down the overheated economy. The retrenchment measures succeeded in stabilizing prices, but they also resulted in a sharp slowdown in economic growth, particularly in the industrial sector. In order to avert a looming economic crisis, in late 1990, the authorities resorted to stimulating monetary and investment policies to reactivate the economy. In 1991, the economy began to recover, reflecting the success of the change in policy. During this latter period, the authorities took advantage of the stable prices to make substantial realignments in relative prices and to liberalize certain prices.

Phase IV (1992-2008)

In early 1992, the authorities declared an end to the ratification program and announced their intention to accelerate the process of reform and opening up. The process came to an end in October 1992, when the Communist Party formally put forward Deng Xiaoping's view that the market system was not incompatible with the ideals of socialism and called for the establishment of a socialist market economy. This has created the unique characteristic of China's economy and paved the way for the PRC government to formulate

comprehensive plans to establish a fully market- based economy.

In March, 1992, the country's constitution was amended to delete references to a planned economy and to enshrine the new goal of establishing a market system. In late, 1993, PRC government introduced a comprehensive economic reform program to bring about a "socialist market economy," which included an acceleration of the work to develop a legal regulatory framework to support this new role and functions of the government, it also speed up enterprise, financial and social reforms. It was not until the time of the 15th National Party Congress (12th -18th September 1997) that the reform of State-Owned Enterprises (SOEs) was put on the top of the economic agenda. This is the most critical and difficult problem needed to be tackled by the reformers.

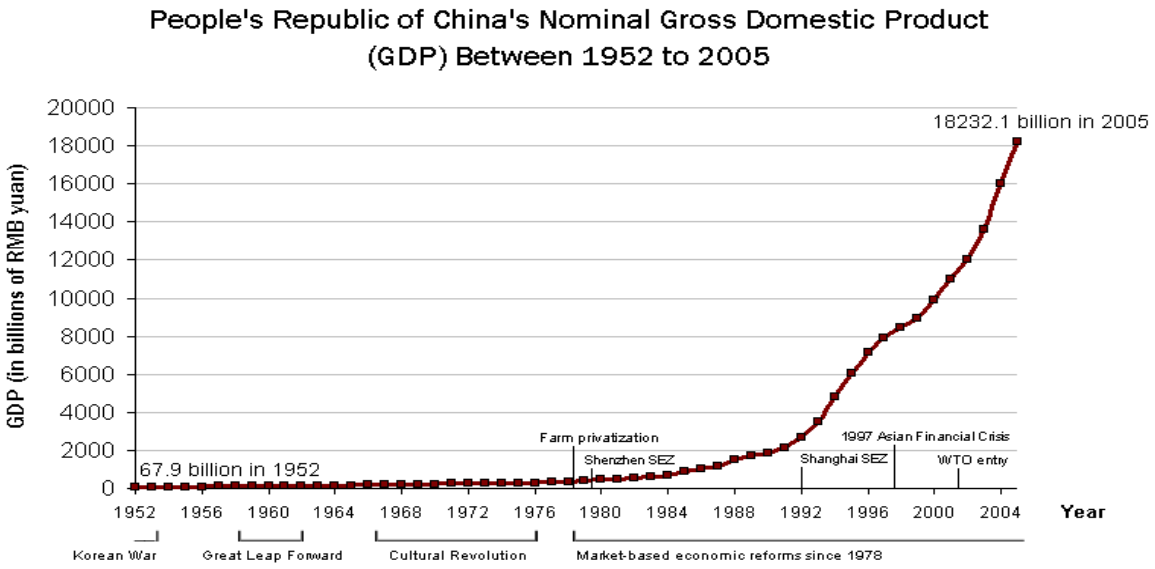


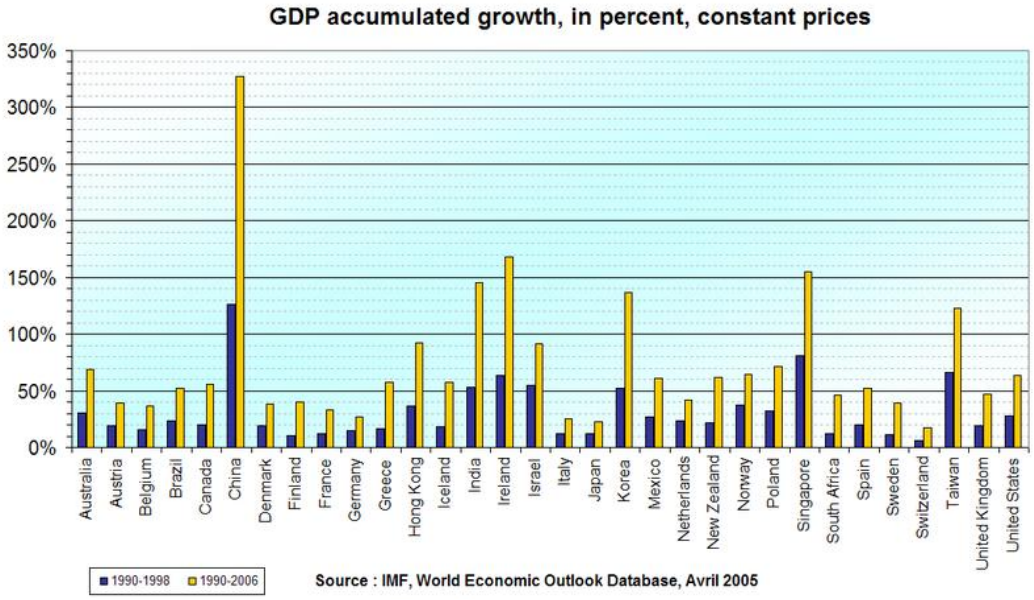
Fig. 1. Graph showing China's nominal GDP trend from 1952 to 2005[2]

China's economy grew at an average rate of 10% per year during the period 1990-2004, the highest growth rate in the world. China's total trade in 2006 surpassed $1.76 trillion, making China the world's third-largest nation after the U.S. and Germany.

[2] Source: http://en.wikipedia.org/wiki/Economy_of_the_People%27s_Republic_of_China

Phase V (2008- present)

In the year 2008, China hosted the Beijing Olympics and this has remarked a new step of China towards the world. Although at the same year China had experience a number of natural disasters, such as the January's heavy snowfall in northern part of China, which paralyzed transport and cut electricity; May's devastating earthquake in Xichuan, which killed nearly 70,000 people and left 18,500 missing; and summer floods in southern China added pressure on China's economy, yet economy remained strong and had achieved a leading position to the world especially after the financial Tsunami broke up in the wall street



market.

Fig. 2. Graph showing increase in GDP in major cities[3]

[3] Source: IMF, World Economic Outlook Database, April 2005

On January 14, 2009 as confirmed by the World Bank the National Bureau of Statistics of China published the revised figures for 2007 financial year in which growth happened at 13 percent instead of 11.9 percent. China's GDP stood at USD 3.4 trillion while Germany's GDP was USD 3.3 trillion for 2007. This made China the world's third largest economy by gross domestic product. Based on the figures given, China grew the fastest in 2007 since 1994 when the GDP grew by 13.1 percent.

As the end of October 2009, China owned $798.9 billion in U.S. Treasury bills, bonds and notes. This is 23% of the total of $3.5 trillion held by foreigners. China surpassed Japan as the largest foreign owner in September 2008. China does this to support the value of the dollar and keep the yuan low.

This makes China America's largest banker, giving it leverage. For example, China threatens to sell part its holding whenever the U.S. pressures it to raise the yuan's value. China counters by raising the yuan's value by 20% between 2005 and 2008.

In 2008, China pledged 4 trillion yuan, about $580 billion, to stimulate her economy to avoid recession. The funds which represent 20% of China's annual GDP are spent over for the coming two years 2009 and 2010, known as Economic Stimulus Plan. The main purpose of the funds is for providing a low-rent housing, infrastructure in rural areas and construction of roads, railways and airports. China increased tax deductions for machinery, saving businesses 120 billion yuan.

The PRC government also raised both subsidies and grain prices for farmers, as well as allowance for low-income urbanities. This has eliminated load quotas for banks to increase small business lending. These policies not only aim at giving a more equal living standard towards the whole society and gives incentives for its people to start their own business.

Now, China is the largest creditor of the United State and its influence towards the world is undeniably getting more and more powerful. This was reflected in the recent discussion of the air pollution exhaust and the killing of the blue fin Tuna in the Japanese sea where China held a

strong position in its view. Besides, trading partners that wanted China to increase its exchange rate of the RMB was denied by the China government in many occasions. It can be see that the unique market characteristic of China that is combining the market and social economy together made China became the world leader and this position wouldn’t be replaced in the short future.

2.1 Characteristic of China's transition economy

According to Zhang (2001), Lardy (1991) mentioned unlike the social reform in countries in Eastern Europe and the former Soviet Union, the reform process in China has often been characterized as gradual and incremental, or in some occasions as an ad hoc approach. This is probably due to the difference in their political circumstances of these countries at the time the economic reforms were initiated. There was a primary contradiction at the outset of the reform and later on with the reform process, which compelled the Chinese leadership to find a solution to develop the economy, and at the same time, get the two sides of the contradiction balanced. First, in China the Communist Party remained intact. It continued to act as a body that controls the policy of the country and develop China into a modern state while remaining its political power.

On the other hand, a strong anxiety of economic development and the resistance of political movement have emerged implicitly in the whole society and the top leadership. In practice, the reform took placed first on an experimental basis in dome localities before they were applied to the whole country.

According to Zhang (2001), when compared to the west during the middle ages, there are two characteristic of the Chinese ancient land management system were obvious. First, Land in China can be traded on the market. It was during the Qin and Han Dynasties that land trading became the main instrument of land concentration, and remained so until the end of the dynastic era. As a result the Chinese land ownership system was not stable at that time and had led to the absence of a strict social class structure in the society. On the other hand, in the west, land was awarded to royal family members and people who had contributed to the establishment of the empire according to their ranks of nobility. Merchants and farmers could hold land ownership through its purchase. So, there were always farmer-owners who held only a fraction of the total farmland. The existence of farmer-owners not only provided targets for land concentration activities, but also stimulated the incentive of the farmers to cultivate their land meticulously.

Zhang (2001) also mentioned that the second characteristic was the manor system could not be formed under the Chinese ancient land

management system. First of all, since land trading was the main measure of land concentration acquiring a large amount of joint land was not possible. Second, even there was a large piece of land; there still had a threat of that land being broken by land trading and inheritance by different inheritors of the family. Also as the farmer-owners' land was scattered in other land parcels, which made the impossibility of the manor-type cultivation system to emerge.

Since 1978, administrative apparatus of planning had been decentralized by severing the ties between the economic agents and the state. This was achieved by allowing economic agents to base their decisions on market signals, and by conferring considerable autonomy in resource allocation on the local governments. This has become a self-sustaining process since the local authorities have used their growing autonomy to strengthen their hand in negotiations over resource-sharing with the center and in taking initiatives in such areas as investment.

Since the decentralization has proceeded, traditional administrative system of macroeconomic control has become less effective as local authorities and state-owned enterprises have gained greater autonomy to pursue their narrow objectives of promoting growth and development within a relatively weak framework of financial discipline. The task of maintaining macroeconomic stability is likely to remain one of the key challenges ahead even as the authorities take steps to establish a more effective system of macroeconomic management.

2.2 Urban Land Reform in China

Prior to 1912

In China, the private property ownership system was not formed until the end of the Qing Dynasty and this was the outcome of the feudal system. According to Zhang (2001), although there were attempts to revive the public land-allocation system, such as the tian chao tian mo ji du adopted by Hong Xiu Quan, emperor of the Teiping Heavenly Kingdom (1851-1864) (Li, 1999), the private market still managed to operate effectively.

1912-1949

Qing Dynasty was overthrown in the republic revolution in 1911, and for the republic was established in China in 1912 for the first time in China's history. At that time, equality in property rights and capital limitation formed the core of the people's concept on governing. According to Mr. Sun Yat Sen, who was a highly regarded and respected politician, and was regarded as the father of the nation imposed that, equality of property rights could be realized by imposing a land tax, the value which was to be assessed by the landowners.

In 1922, equalization of land rights principle was implemented, Mr. Sun was at that time the president of the newly formed republic of China. The republican government devoted great efforts towards land management, which included land management institutional structuring land legislation, and cadastral reorganization. However due to the lack of unified standards of the program, only a few re-organization work had been carried. The land management authorities began to carry out the cadastral re-organization not until 1936 when the Land Law, together with the Implementation Rules of the Land Law and Implementation Procedures for Provinces and Cities were all enacted.

By 1930, the first land law was announced to deal with land use, land surveys, land taxes, land rights, etc. Before the announcement of the land law, there were nine basic principles of the law, which was promulgated in 1928:

1. Land taxes were to be based on land values
2. The land tax rates were to be based on a progressive rating system

3. A capital gains tax would be imposed on incremental rises in land value, which was regarded as unearned income
4. The state could, upon payment of compensation, make compulsory land purchases for national purposes
5. Land taxes would be exempted from land used for government/public purposes
6. The tax on buildings would be lower than the tax on land
7. In relation to (6), improved land use would be encouraged
8. Land administration departments would be established at the provincial and city levels
9. Prior permission from the government must be sought for the transfer of land rights

In 1937, Sino-Japanese war broke out which lead to an insufficient financial support, cadastral re-organization work has been mainly concentrated in urban areas and little had been done in the rural areas. According to Li 1999, the law stated that under special circumstances such as to satisfy special local needs with respect to types of land and qualities of land, the state could set a limit on the maximum are of each piece of private land in recognizing the existence or private land

ownership. However, the law at that time was not effective due to the difficulty of coordinating the large number of provinces and cities. The law was revised in 1946 in accordance with the 23 principles proposed by the Central Land Special Committee in 1937.

Before 1949, Land system in China was basically identical to that was used in the Qing Dynasty and land ownership concentration continued. Except for a small number of districts that are already under the control of the Communist Party, most rural lands was owned by landlords and only a small portion was owned by peasants. There were two types of land owned by the landlord, first one was the land was farmed by hired farmer and another was by tenant farmer who submitted land rent in various forms. However, the landlord bore the government's land tax.

Due to the early implementation of the private land ownership system, lands in China had always been relatively active transacted. However, China's land market seemed to develop in an unhealthy way today. Widespread speculation, skyrocketing land prices, or even the taking of land by force or trickery were common phenomena.

In China, where agriculture was the primary industry, land normally became the basic input of production and means of survival. The feudal land ownership system produced a great amount of poor Chinese struggling in the position of poverty and starvation, and made the efficient utilization of land and improvement of productivity difficult. Inevitably, the feudal land ownership system led to a series of social conflicts and social unrest. From the prospective of history in China, almost all social conflicts in China were basically induced by land problem or problems that are associated by land. As a result, when the Communist Party entered the stage of contemporary Chinese history, the reform of the land ownership system naturally became one of its foremost social revolutionary objectives.

1949-1979

After the founding of the People's Republic of China in 1949, the First Session of the Chinese People's Political Consultative Conference passed the "Common Principles". According to it, the feudal, semi feudal land ownership system will be replaced with a farmer's land ownership system in steps (Zhang, 2001).

At the beginning of 1949, the new government began to confiscate the land from landlords who rented out their land and surplus land was seized from rich farmers in areas that had been taken over earlier during the War of Liberation by the new government. Land reform distributed land to peasants and laborers who previously owned little or no land themselves. In June 1950, this transformation which was governed by the PRC's Land Reform Law was announced and ended in 1952. Where a new rural system was established, that is the system of private land ownership by laborers and peasants. At that time, only a small amount of public land was retained in accordance with the law.

In 1953, the PRC government announced its core policy for transforming a neo-democratic to socialist society. Its ultimate objective of the socialization was to change the ownership of the means of production, making state ownership and collective ownership the economic foundation f the nation. Later, the "Rural Cooperative Movement" and "Urban Socialist Reform Movement" was targeted to this objective.

In the real estate industry, the government changed the private ownership of real estate property by means of joint state-private ownership and the government management of leases. At the same time, the government stipulated in its policies that urban land such as open spaces and stress that were occupied by individual should be returned to the state, by 1958, the majority of urban land was owned by the state, except for commercial land owned by individual laborers and residential land owned by urban residents. But after the 1958 Great Leap Forward, the People's Communization Movement, and the Cultural Revolution, the urban private ownership economy basically disappeared. Previous owners gave up or were forced to give up housing rents or even to transfer property rights.

Not until the economic reform launched under the open-door policy, the land system in China has been under the practice of allocation of land by the state to the user without charge and limitation on the length of use and any private land transaction was prohibited.

To conclude, there was a lag between the theoretical framework of Chinese urban land reforms and the needs for the economic reform process and land management practices in the “open cities” under the open-door policy and coastal cities. For example, land lease was not granted in Shenzhen until 1978 which was prohibited by the law at that time. As suggested by Li (1996),

> *“In examining the reforms in the Chinese real estate market, we must accept the fact that the new 'market system' will operate and be interpreted on the skeleton of a socialist administration. Hence, we cannot, and in fact should not, superimpose capitalist theories of land price behavior onto the privatization agenda of land use rights without first examining what constituted the basic theory of value in China." (P.9-10)*

If one wants to understand the whole economic phenomena in China it is worthwhile to understand the “Chinese interpretations” of the theory.

2.3 Real Estate Market in Shanghai

Shanghai is the largest city in China, and one of the largest metropolitan areas in the world, with over 20 million people. Shanghai is located on China's central eastern coast just at the mouth of the Yangtze River. The city is administered as a municipality of the People's Republic of China with province-level status.

Shanghai is administratively equal to a province and is divided into 18 county-level divisions, which are made up of 17 districts and one county. There is no single downtown district in Shanghai, the urban core is scattered across several districts. Prominent central business areas include Lujiazui on the east bank of the Huangpu River (Pudong) and The Bund and Hongqiao areas in the west bank of the Huangpu River (Puxi). Nine of the districts govern Puxi (west of Huangpu River). These nine districts are collectively referred to as Shanghai Proper or the core city. They are (1) Huangpu District; (2) Luwan District; (3) Xuhui District; (4) Changning District; (5) Jing'an District; (6) Putup District; (7) Zhabei District; (8) Hongjou District; (9) Yangpu District. And in this thesis, Pudong New Area will also be added to the list of study. These area includes (1) Baoshan District; (2) Minhang District; (3) Jiading District; (4)

Jinshan District; (5) Songjiang District; (6) Qingpu District; (7) Fengxian District. And Chongming Island is an island at the mouth of the Yangtze, it is governed by the Chongming County.

In 1992, the former Communist leader Deng Xiaoping visited Shanghai to support his open door policy in China, this have given a certain encouragement for the development of real estate in Shanghai. The major target consumers for the real estate at that time were most foreign investor. Until 1996, the real estate market faced a trough, where there were a lot of vacant commercial properties and bad debt in bank due to failure in repayment for the people's mortgage in real estate market. Not until 1997, where new policy to push the real estate market was adopted, such as reduction and refund of property tax, removal of commercial and mixed property allocation, etc. By 2000, property market in Shanghai started to recover and real estate price and real estate development climbed to new peaks. In 2003, the development of the Shanghai real estate market was the quickest and policies were made to slow down its development and increase of property price to avoid bubble to occur. The success of the policy was

shown at the 1st half year of 2004. However in the 2nd half year of 2004, the property market became hot again. The following table shows the summary of property market performance in Shanghai for the major years,

Year / Parameter	1995	1998	2000	2001	2003	2004	2005	2006
Increase in Real Estate value	91.29	185.4	251.7	316.9	373.6	463.9	622.6	670.2
% in GDP composition	3.7	5	5.5	6.4	6.9	7.4	8.4	7.3
Real Estate Investment	466.2	577.1	566.2	630.7	748.9	901.2	1175	1246

Table 1. Showing the property market performance in major years[4]

After the "tenth 5 years policy" adopted in China since 1949, development of Shanghai's real estate market can be summarized into the following,

[4] Source: Shanghai Real Estate Development Report 2007

Real Estate market had become one of the major pillars in Shanghai's economy; its contribution towards Shanghai GDP maintained an upward trend. People's living standard in Shanghai has increased. Floor area per capita has increased from 6sqm in 1990 to 15.5sqm in 2005.

Through studying the real estate performance of different countries, it can be justified that real estate market is one that has a very high correlation with other industries within a society. For instant, a prospective real estate market will give opportunity for other industries such as construction, metal and concrete production and financing industry, on the other hand it also indirectly gives demand for household products such as household machinery, interior design, estate agency, property management services industry. As a result the government in Shanghai is very keen and strict on manipulating the real estate market, at the objective to prevent bubble and provide a healthy growth environment for the real estate market.

In fact Shanghai's real estate market is currently subjected to several threats within its system that may cause unfavorable impact in its real estate market and eventually to its whole economy. These problems

can be summarized as follows,

1. Property price increase trend is not eventually distributed in the city

In 2003, Shanghai's average price of commercial property transaction was RMB5118/sqm, it increased to RMB6385/sqm in 2004 and eventually to RMB6698/sqm in 2005. The general increase in property prices in commercial and residential land use was 14.6% but it's increase is not evenly distributed, where the property price increase in the first tier district can be as high as 27.5% and as low as 5% in third tier district. Continual increase in property price in Shanghai gave a higher pressure for new graduates to buy their own houses and directly reduce the people's expendable income. Such high property price situation would have lead to more social problems in the future. On the other hand, people in the city are forced to move to a more rural district creating a greater gap between the high income class and low income class.

2. Over reliance on bank mortgage

Since 1998, banks in Shanghai have become more willing to provide property mortgage to their customer and this created a unhealthy competition environment within the banking system in Shanghai. In 5 years time, the number of personal and commercial property mortgage had increased about 66.2 % per annual. Until the year end of 2003, personal property mortgage constituted 18.38% of the total credit loan in the whole Shanghai banking system, in 2004, unpaid personal property mortgage constituted 36.85% of the annual GDP of Shanghai. According to an official study on personal mortgage[5], the proportion of family debt burden in Shanghai was 155% and at the same year it was on 122% in Beijing, this figure was far higher than 115% in the United States.

[5] Shanghai Real Estate Development Report 2007

The following table shows the bank mortgage on properties in recent years,

Debt / Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Household Personal Property Mortgage Debt (billion)	16.23	30.3	54.9	91.5	140.4	205.5	272.6	297.9	289.9
Commercial Personal Property Mortgage Debt (billion)	7.76	15.9	34.1	65.0	108.6	170.9	238.0	264.4	248.3
Property Fund Mortgage Debt	8.48	14.3	20.7	26.5	31.8	34.6	34.6	33.5	41.6
% in GDP	4.40	7.51	12.07	18.49	25.97	32.88	36.85	32.59	28.16
% in Bank lend out loan	3.81	6.23	9.21	12.73	15.48	18.38	18.21	17.74	15.59

Table 2. Showing the mortgage performance in Shanghai[6]

[6] Source: Shanghai Real Estate Development Report 2007

3. Insufficient provision for public housing in Shanghai

Since the economic reform in Shanghai took place, resources allocation was left to be driven by the market force, previous practice of central planned economy where resources where allocated by the government is no longer valid. This creates a situation where some people, particularly the poor have no house to live. Besides, government provided cheap rent housing is less than 0.5% of the total property stock in Shanghai, this shows an absence of a systematic planning for public housing. On the other hand, government's role in providing public housing is not clearly defined as a result many poor or low income people are not housed.

In this thesis, Shanghai is selected as the object to be studied to see whether market drivers on land price do apply in cities in China, which is a socialist country.

Chapter 3 Literature Review

According to Li (1996), Land price and land value can be substantially different; the former depends very much on the market atmosphere at the point of time when a particular piece of land is being negotiated for transaction, whereas the latter points to a more subjective measure of total future returns that can be obtained from the ownership of land.

Land value is a theoretical concept, its nature is basically the same in any economy as long as a market mechanism is set up and allowed to operate for the allocation of land. Land price, however, can be "planned and controlled especially in a socialist economy.

According to Lichtenstein (1983),

> *"…value originates in production; money price originates in circulation. The connection between value and money price is therefore the connection between the spheres of production and circulation…values determine direct prices; direct prices get transformed into prices of production; and market prices will fluctuate around these prices of production….[While] this process of successive price transformation takes place, the value structure of output stay the same, the prices at which this mass of value circulates throughout the system do not, and cannot, alter the value of this mass.." (P.167)*

Obviously, price and value are different concepts and consist of different component of determinants. This is especially true for the real

estate market, where land price is a historical figure that marks the transaction price, while land value usually involves some level of future expected income that can be generated in land. Although at certain occasion they may refer to the same thing or closely related, yet price and value should be consider as two different thing s and should hence be studied separately.

In this paper, the objective is to focus on the composition and determinant of land price in Shanghai, thus valuation of land and land value will be ignored in this study.

3.1 Theory of Rent

According to Li (1996)

> *"Under the doctrine of private ownership, in modern appraisal theories and land economic principles, land rent becomes the basis for the determination of land utility or value." (P.17)*

Therefore it is necessary to have a brief knowledge on the theory of land rent before moving on to discuss the market land price behavior of a location.

The theory of rent was first studied and realized by Ricardo (1821) which is the published book of his work in 1817 The Principles of Political Economy and Taxation[7]. He defined rent as the portion of the produce of the earth, which is paid to the landlord for the use of the original and indestructible powers of the soil.

In his study on the corn farm, he pointed out that the most fertile land would be first used and the less favored land is used as the demand of agricultural product increases. The rent on the most productive land is based on its advantage over less productive land with competition

[7] Ricardo claims in the preface that Turgot, Stuart, Adam Smith, Jean-Baptiste Say, Sismondi, and other had not written enough "satisfactory information" topics of rent, profit and wages. He aimed to fill that gap in the literature.

among farmers. And the advantage a land possesses is equal to the value of the difference in the productivity of land. In his paper, he also realized the importance on location affecting the land rent. He stated that land that is closer to the market bears lower transportation costs for its production to the city centre than land far away and this advantage is accrues to the landlords in the form of rent as farmers compete among themselves for location. Besides, he also explained that land rent does not only account for the natural fertility of land but also the increased in production due to the higher capital investment.

Assumptions of Ricardian rent theory are that the supply of land is fixed and that a single product is produced (corn in his original work) from this given supply of land. In short, rent of and is solely demand-orientated.

In Ricardo's study, he considered market price fluctuation as unimportant and irrelevant to his long-run analysis,

> *"We shall leave them entirely out of our consideration whilst we are treating the laws which regulate natural prices…In speaking then of the exchangeable value of commodities, of the power of purchasing possessed by any one commodity, I mean always that power which it would possess, if not disturbed by any temporary or accidental cause, and which is its natural price…" (P.102)*

Such argument runs from his other main assumption of free capital mobility that:

> *"It is…the desire, which every capitalist has of diverting his funds from a less to a more profitable employment that prevent the market prices of commodities from continuing for any length of time, either much above or much below their natural prices…" (P.84)*

According to Ricardo's work (1821),

> *"…when land is most abundant, when most productive, and most fertile, it yields no rent; and it is only when its powers decay, and less is yielded in return for labour, that a share of the original produce of the more fertile portions is set apart for rent..." (P.63)*

In other words, when an economy is still at a primitive stage and there is abundant supply of land, no monetary charge will be laid on land because it is a free good, just like air or water and it has no production function. Only when the demand of these natural resources exceeds the supply of them creates a cost of using them-opportunity cost.

Similarly when this principle is applied on land use price, land price should be valued as zero when the supply of land far exceeds the demand of it. However as human economic activities increase due to increases in real income and hence increases in real demand, utilization

of the most accessible and fertile land will soon be saturated. Lands start to be distinguished by site-specific factors and private landownership begins to emerge.

Land rent according to such situation represents the differences in productivity between the surplus profit, (difference between grade one and grade two land). If an existing producer on grade one land does not pay such amount (rent), then producer on grade two land or other would be producer who outbid the existing producers. Eventually all producer will have to pay the new level of rent for grade one land in order to stay in business. Hence, land rent, the summation of which becomes land value emerges from differentiation in land productivity.

Under Ricardian School, land value is solely a residual element and therefore marginal land where soil productivity is nil commands no rent at all. However, this is not completely true. When private property right is taken into account, landlord can and will charge a minimum rent (value) for even the worst and least productive land. Evans (1988) stated that, this absolute rent (the minimum price or rent a landlord

insists on charging even for the worst land) may be demanded by a landlord due to various types of transaction cost. This includes risk, uncertainty and land of market information.

In Harvey (1992), rent is defined as,

> *"…theoretical concept through which political economy (of whatever stripe) traditional confronts the problem of spatial organization and the value to users of naturally occurring or humanly created differentials in fertility." (P.90)*

Harvey (1992) also stated that land can be treated as another type of financial asset which amounts to a property right over some future revenue,

> *"In the case of land, what is bought and sold is the title to the ground rent yielded by it. That ground rent, when capitalized at the going rate of interest, yields the land price…Title to land becomes a form of fictitious capital, in principle no different from stocks and shares, government bonds, etc. Land in short, can be regarded as a pure financial asset." (P.96)*

Thus the importance of location advantages to the determination of land price is reflected in the positive effect on the receipt of future income in the traditional land price approach. This future income in the modern economy rely very much on property values and rental values that the developer or landowner can extract from real estate development.

However, in a central planed economy or transitional economy like China, land price can be treated as an administration tool while the property market is left to the price mechanism to regulate. There is a doubt that whether land values can actually reflect future incomes from land.

3.2 Traditional Approach in studying land price behavior

Since there is a doubt whether land value in China could properly reflect the future income from land, yet it is necessary to build up a framework to study the land price determinant in China. This section is aimed to provide a foundation for the analysis of the market factors affecting land price behavior in China.

Traditionally, land price valuation is determined by the urban structure approach, where the major determinants of land price are transportation cost or the cost of friction. Hence the main independent factor is the location from the urban centre. The closer to the centre, the higher the rent a user is willing to bid when economic activities depend on meeting customer frequently.

Alonso (1964) put forward a mechanism which explains the market solution to various users of land by estimating individual bid-rent behavior. According to Alonso (1964),

> *"The essential point to be grasped from the market solution…is that price at any location is related to the price at other locations by means of the bid price curves of the users of land. The price paid by a user at his equilibrium location is equal to the value at that location o his bid price curve at his next most preferred location…" (P.21)*

Due to the fact that land are immobile and unique in nature as well as limited supply, not every user can enjoy the most favored land and hence marginal land has to be brought to use. In other words, landlord's income from land is equal to the sum of land costs, commuting costs and other expenditures and this is transferred into the Alonso's budget equation as:

$$Y = PZz + P(t)q + k(t)$$

Where,

Y = Income

Pz = Price of the composite good

Z = Quantity of the composite good

P(t) = Price of land at distance t from the centre of the city

Q = Quantity of land

K(t) = Commuting costs to distance t

t = Distance from the centre of the city

Since the equation sets the constraint on land consumption alternatives open to each consumer or land user-group. Under such circumstances, land rent to any particular location becomes (for agricultural economy):

$$\mathrm{Pc(t)} = \mathrm{N[Pc - C - Kc(t)]}$$

Where,

Pc(t)= The rent per unit of land at a distance to from the market

N = Number of units of crops produced per unit of land

Pc = Price per unit of the crop at the market

C = Cost of producing one unit of the crop

Kc(t)= Cost of transporting one unit of the product at a distance to the market.

This equation represents the residual surplus profit that a landlord is able to extract after all production and transportation costs have been allowed. When this analysis is expanded to include all other production activities, it can be illustrated below:

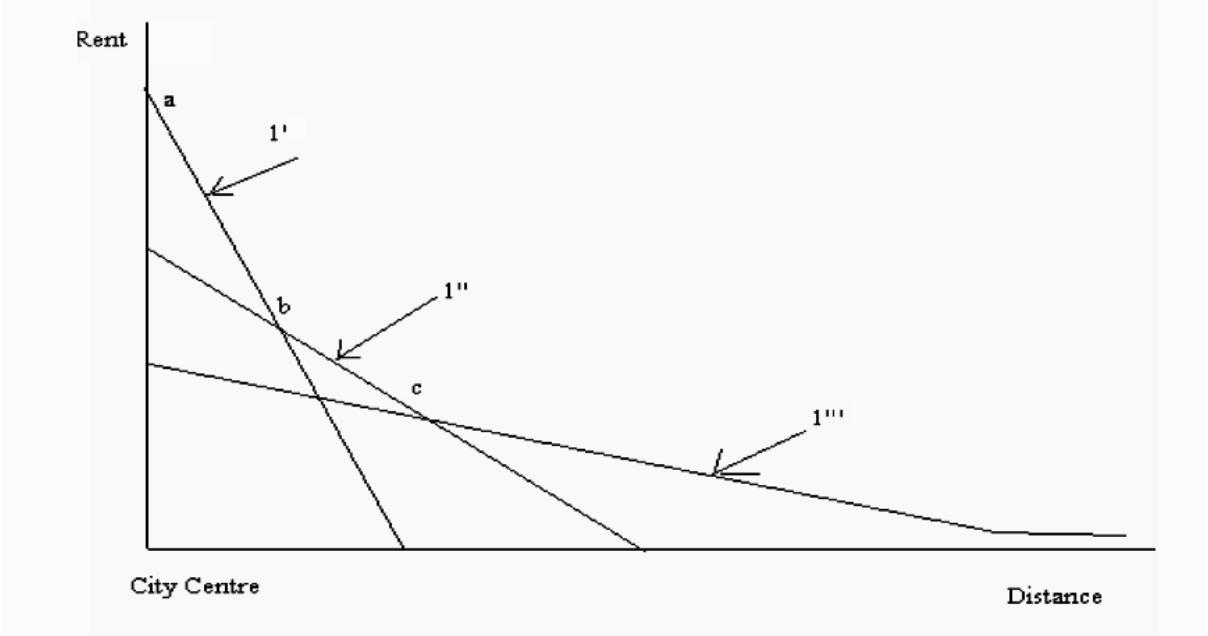


Fig. 3. Graph showing the formation of Bid-Rent Curve[8]

The graph shows that there are three land user groups each with different budget equation, and hence, different ability to pay rent. They are able to outbid other users over a certain range of distance from the city centre. As a result, the Bid-Rent curve of the overall city becomes the curve “abcd”. One point to notes is that in Alonso’s original analysis, point d touches the X axis such that at the very far end of the city no rent is payable. However as justified above due to the present of private land use right this zero land price is not applicable in the real world situation as there is always a minimum price (absolute rent) required by the landowner for him to rent out the land, otherwise he

[8] Source: Li Ling Hin (1996), Privatization of Urban Land in Shanghai, Hong Kong: Hong Kong University Press P.21-22.

will just leave the land untouched.

Alonso also suggested that the main determinants of land value depend on location differences. However, this point shows the weakness of the model because the assumptions behind are not realistic. These assumptions include (1) a featureless plain on which all land is of equal quality and ready for use without further improvements; (2) both buyers and sellers have perfect information.

Due to these unrealistic assumptions, the theory that land price mainly depends on distance from the centre of the city is doubt by many researcher. Needham (1981) comment on the urban structure approach as,

> *"…has the disadvantage that difference between plots of land (besides difference in location) which might be important for land price cannot be incorporated in the approach… And it is just the peculiarities in the supply of land which distinguish the theory of land from the theory of other factors of production…" (P. 91-104)*

Li (1997) suggested that due to advancement in technology especially in the areas of telecommunication and growing complexity of the structure of the land market, there are more attributes to the determination of land price than just locational convenience in a modern urban economic context.

3.3 Contemporary Approach of Land Price Behavior

Theoretically, land price is determined by the rent-earning capacity of competitive land use. In general, the rent will depend on the businessmen's profit maximizing decisions and household's utility maximization consideration. Thus any factor that can affect the net gain on land income can affect the land price. Ricardo's theories of land price provided the framework for urban land economic. We consider further and apply it to modern economy, factors that might influence land price behavior could be infinite, rather just transportation costs or fertility in the model.

This section would go through some more scientific and financial analytical method in the determination of land price other than considering locational factor alone. McDonald and Bowman (1979) suggested that,

> *"It is not even necessarily true that land value always declines with distance to the CBD if some of the determinants of land value, other than transportation cost to CBD, are related to distance…that the coefficient of distance to the CBD in a regression explaining land or property values can be of either sign…" (P.25-41)*

Their finding was that the actual residential land price function in Chicago exhibits complex curvilinear shapes and hence land prices may not decline in direct relation to the distance from the CBD. In their findings, zoning, racial composition and neighborhood effect improve the explanatory power of the regression equations considerablely.

According to Li (1996), Walters (1983) examined the rising urban land prices in terms of opportunity cost o the land. The fact is that the supply of valuable land at the city center cannot be increased, but can only be used differently. This means that the choice of use is crucial and so the value of using land in different ways must be assessed in terms of the stream of outputs or returns from the land in its most likely alternative use. However, this Opportunity cost of land use may change when constraints on land use is changed, even when the most efficient use remains constant, thus it does not necessarily refer to the net output of land in its next most efficient use. Walters argued that since land is a kind of asset, the price of land should not be compared with the general price level of housing price but with prices of other assets

Li (1996) also mentioned Neutze (1987) put forward a model of land supply in terms of landowners maximizing return from their land but are subjected to constraints. The model started with a non-financial utility derived from the occupation and ownership of land which varies with the use of land and between owners. Second, land use decisions and lad value depend on expectation for the future, as well as on present market condition. Third, uncertainty about the future gains from deferring development.

According to Neutze, these assumptions were capable of explaining the urban sprawl at the city fringe, the persistence of vacant land in close proximity to highly developed land and the observed anomaly that urban land values can be many times agricultural values even at the city fringe.

Neutze went on to argue that because withholding land from development depends so much on uncertainty and planning reduces uncertainty, planning can actually hasten development.

In Neutze's study, he stressed the role of expectations about future land value. In an area of economic growth, the potential development value is also likely to grow gradually in real terms and therefore there is little to lose and potentially much to gain by holding onto the land. In a perfectly informed system this situation would not be possible as current prices would reflect future prices.

Bramley (1989) pointed out that after the creation of new town in the middle of previously undeveloped countryside or the opening of a new transport facility, there is no problem for the inelastic land supply in a given area with a given population, when there is an increase in demand, it may cause some outward movement of the city, but the main effect is increased density and increased prices.

Concerning the above literature seems that there is no fundamental theory of land price, which can be applied to explain various phenomena in the land economics context. Most attempts made by researchers try to modify the standard model to explain the anomalies in land economics. It was found that there are so many factors which

could be important in determining land prices and attributes of prices could vary substantially form one form of land use to another.

However taking the view of Harvey (1989) that a land can be treated as another type of financial assets, which amounts to a property right over some future revenue, the importance of locational advantage on the determination of land prices as stipulated by the standard neo-classical land theory is reflected in its positive effect on the receipt of future returns.

Based on Brown and Achour (1984) examination on whether valuation principles are widely applied to the pricing of options to purchase land. Titman (1985) provided a valuation equation for pricing vacant or underused land which is adjacent to utilized, very highly-priced land. Similarly, Titman's model is based on the financial literature on stock options. In Titman's model a vacant site is viewed as an option to purchase one of a number of different possible buildings at prices that are equal to their respective construction costs. He looked at the problem from two angle, (1) valuing land as a site for constructing a

particular building at the current time and (2) valuing vacant land as potential building sites.

According to Li (1996), since (1) was fairly straightforward, Titman concentrated on (2). Instead of assuming a certain type of building to be constructed, this approach takes into consideration the fact that the amount of uncertainty about the type of building that will be optimal in the future is an important determinant of the value of the vacant land. Hence, the higher the degree of uncertainty of the most optimal building to be put up in the future, the more valuable it is to keep the land vacant and less attractive to develop the land at current time. As suggested by this analysis, land is regarded as no different from other financial assets such that vacant land can be valued by forming a hedging portfolio. As a result, value of land is a function of three kinds of investments, namely land, building units and risk free assets.

According to Li (1996), Titman's analysis suggested that among other things that government actions stimulating construction activity may have the opposite effect of the extent and duration of the activity is

uncertain. As a result, increase in uncertainty in future market conditions may lead to a decrease in building activity. Titman also argued that the introduction of controls, such as height restrictions on buildings setting the optimal height of buildings may reduce the uncertainty and lead to increase building activity. In Titman's theory, future expectation may therefore outweigh the locational disadvantages of a specific site, given that development are irreversible for the immediate period after the construction started. In other words, the correct land use decision may have a greater influence on land value.

Based on Titman's financial option price model, Geltner (1989) tried to integrate a quantitatively capital market theory with traditional theory of urban land markets. This model is very similar to Titman's model with a riskless asset used for hedging. However, Geltner noted that there are fundamental difference between the land application and the financial security application of such a kind of model. Geltner stated one of such difference is,

> *"…it is not possible to model the general equilibrium price under conditions of uncertainty for an asset with the payoff characteristics of vacant land without*

specifying the risk preferences, expectations and wealth portfolio of the equilibrium marginal buyer/seller of the land…

This cannot be done, not only because of the institutional characteristic of real estate markets as compared to financial securities markets, but because of the more fundamental point that the underlying asset does not yet exist…makes it much more problematic to argue that vacant land should behave like a derivative asset whose price can be modeled using arbitrage relations between existing tradable assets…" (142-158)

According to Zhang (2001), both traditional structural model and the asset approach to land value are put forward and examined by Capozza and Schwann (1989) and Capozza and Helsley (1989). Capozza and Helsley tried to develop a model of land price based on the structural mode in which they tried to incorporate four major additive components into urban land price, namely the value of agricultural land rent, the cost of conversion, the value of accessibility and a growth premium of the city. They also showed that in a dynamic context, an efficient land market naturally produces a gap between the price of land at the boundary (less conversion cost) and the value of agricultural land rent, which is very different from the traditional structural model that land price is proportional to land rent. For instant, the price of land at the boundary of an urban area equal to the value of agricultural land rent. Their analysis is shown graphically in Fig 4.

However, in their findings they stated that their model cannot explain unusual differences between urban and agricultural land prices at a single location and that urban and agricultural land prices must differ by the cost of conversion. Otherwise, landowners or developers would earn abnormal profits whenever there are barriers to enter in land development. On the other hand, imperfect information on the part of agricultural landowners or inventory profits during a period of unexpected appreciation that there can be a significant differences between urban and agricultural land prices. This in fact fits into the existing situation in the land market in China.

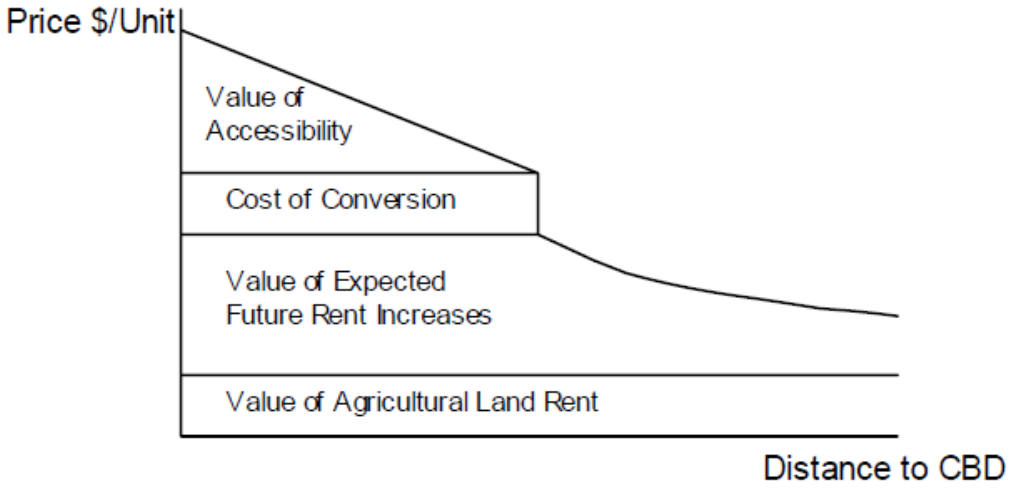


Fig. 4. Graph showing the Land Price Inside and Outside Urban Area[9]

[9] Source: Li Ling Hin (1996), Privatization of Urban Land in Shanghai, Hong Kong: Hong Kong University Press P.25

In addition to Geltner's view that the equilibrium underpinnings that gives the financial option pricing model its strength in financial application do not extend to the land application due to the imperfections in the real estate markets and due to the fact that the underlying asset in the case of land does not yet exist. Wheaton (1989) supported Geltner's view by stating that the major problem with trying to test either the options approach to land pricing or the CAPM model involves the measurement of land's "risk", availability and reliability of data on both financial and real estate markets must be a pre-requisite for the method. This however is not easy in practice, especially in the transitional economies in which only a small portion of market information is beginning to accumulate with the development of the market itself.

Since the practice of prerequisite of a financial valuation model is not easy, assumption is always needed to complete the model. Draper and Findlay (1982) stated that,

> *"In order to obtain simple, intuitive and logical valuation models, some degree of regularity in the market must be assumed. Restrictions are generally placed on either the preferences of the participants or the distribution of returns.*

These homogeneity assumptions are required because theories permitting all possible combinations or preference and return distributions would most likely result in valuation expressions too complex to be appealing and in empirical validations too cumbersome to produce meaningful results…" (P.184-200)

Evans (1983) studied the land price behavior by looking at the conversion process of agricultural land to urban development land. He found that the price of land depends on the actual and expected rate of growth of the city and the increase in employment in the city centre leads to an increase in the demand for urban land. Such increase in demand further lifts the premium required by the agricultural owners to give up their land for development.

To conclude, the fundamental concept of land value in market economy is discussed above. In a modern urban economy, land value represents a residual nature which depends on the economic activities being carried on it. Thus land itself doesn't constitute any production cost. Moving on we have to discuss the unique characteristic of the China's economy before moving on to study the land price composition in China.

3.4 Relationship between property and land market

According to Li (1996), Han et al. (1992) designed a land price determination model that is based on those variables that affecting the demand of property. In this study, Han et al.'s model is adopted for the regression on land price composition in Shanghai. Yet it is important to justify the relationship between the land price and the property market first before moving to adopt the model in this study.

Traditional theory of land price given by Ricardo (1821) stated that land rent are high is because of the price of corn was high, not the reverse. Similarly Evans (2004) argued that land prices are high because house prices are high. However, Evans argued that Ricardo's conclusion is based on the assumption that supply of land is fixed and or perfectly inelastic. Given the fixed supply of land, the price will depend on the demand for land which is a function of (or derived from) the price of corn (housing). In Evans's study he pointed out that the price of both land and house are determined by demand and supply of it. Any restriction on the supply of land will raise the price of both.

In supporting Evans's view, Grigson (1986), stated that "house price determine land prices, not the reverse." Applying this logic or theory, one can expect that land price trends to broadly follow housing rice trends. Harvey (1996) also supported this view through his study on the Digest of Building Land Prices 1974. His finding showed that the reasons for the fall in land prices are the fall in house prices and the rise in cost. Harvey concluded that land prices are determined by house prices not the other way around.

Based on Ricardo (1821)'s assumption that the demand is fixed, that a single product is produced from the given supply of land, hence the rent of land is solely demand determined. In other words, the demand for land is derived from the demand for corn, not the other way around.

Similarly, demand for land in the market is derived from the demand for property. Consequently, the land price must be influenced by the demand of the property. And demand derives the price of a commodity; hence in studying the price of land (demand of land) emphasis should

be placed on the demand for property.

Lam (2002) and Law (2005) further suggested that the property price is depend on demand factors like household income, population, real interest rate, inflation rate and also supply-side factor, i.e. housing supply and land supply.

Based on the above literature, it is obvious that, price of land and price of property is closely related and hence through studying the factors the affects the demand and supply of the property could derive the demand and supply of the land, hence the land price determinant factors.

3.5 Land price determinant in China

China is traditionally a socialist central planning economy, unlike those Eastern European countries that had undergo a transition from socialist central planning to capitalist market planning. In China, central planning remains intact and the government aims for “market socialism”. In other words, the existing socialist planned economy system in China will not be swept away completely. This unique Chinese merging of market economies into the socialist macro environment has brought many scholars and sociologist step in and studies its significances on the implication on various parameters in the economy.

The uniqueness of the China’s market socialism had created much problems and argument on how a commodity is priced and valued. Whether traditional supply and demand concept and principle does apply to its pricing strategy, similarly, land is considered as one of the most important resources for carrying out human activities and yet its supply is rather limited, no one can grow additional land out of thin air. On the other hand, it is rather important to value a land for the purpose of land allocation and its cost of respective land use right. It was suggested by Li (1996) that in order to establish a land use (with

payment) system in China, the prerequisite is to understand whether the land market allows land value to be properly reflected and allowed to resume its role in the land use allocation system.

In other words, it is rather important for China now at its transition state to investigate and design a framework that determines its land prices. For its purpose of reform and moving on to enhance its property right concept.

According to Li (1996), “China is monopolized by the local authorities that have full power in setting market land price by the way of private treaty grant. If this view also corresponds to the theoretical view, we can expect that the market environment created under the transitional economy is functionally acceptable and western philosophy in land price behavior can be applied in the examination of China’s land market.”

Han et al. (1992)’s studied the land price changed over a period of time in Taiwan through adopting a model that variables that are considered

to relate to the property and land market are included. In the model, 7 cities are include and a total of 23 variables are used to study the influence on land price,

Population and Income	Financial factors	Taxes	Construction	Economic Indicators
Population Density	Bank Deposits	Taxes Collected	Gross Floor Area	GNP Growth Rate
Working Population	Bank Loans	Capital Gain Tax on Land	Building Cost	Exchange Rate
Household Income	Interest Rate	Land Price Tax	Length of Road	Deposit Rate
Household Expenses	M2 Supply	Conveyance Tax Securities	Area of Roads	Stock Index
	Medium term rate			Consumer Price Index

Table 3. Showing Han et al. (1992)'s model[10]

Through a stepwise regression procedure, relevant variables are entered into the model and less influential variables are sifted out. Two

[10] Source: Li Ling Hin (1996), Privatization of Urban Land in Shanghai, Hong Kong: Hong Kong University Press, P.92

sets of regression analysis examine the effects of the variables on land prices as whole and individual pieces of land. Their conclusion is divided into these two areas. In general, the result showed that,

1. The relationship between population density and land prices is not very high;
2. As far as income is concerned, only the deposit rate shows a positive relation to land prices;
3. Different variables in the economic indicators group give different results. If GNP is removed from the model, the stock index shows a negative relationship with land prices. This, according to the authors, shows that the stock market and the land or property market are competitors for investment funds. A similar negative relationship appears for the M2 money supply variable. And, predictably, CPI has a positive relationship with land prices, meaning land is a good investment to hedge against inflation.
4. Tax variables show a positive relationship with land prices. The authors' expectation is that a rise in land taxes will increase the land costs in transaction and hence increase land prices. However, this should be subject to further analysis of elasticity of demand for land

in Taiwan before such a conclusion can be made. Although land is more or less physically fixed, land uses can be flexible, and accordingly, Henry George's[11] notion of 100% land tax is not acceptable.

5. Contrary to traditional valuation theory that the lower the interest rate the higher the property price, the results of the test on interest rates shows a positive relationship: in Taiwan a rise in interest rate will cause a rise in land price. This conclusion can be attributed to two different reasons. Firstly, a rise in interest rate represents a rise in expected inflation and hence demand for real property increases. Secondly, such a conclusion can also be the result of the interaction of interest rate variables with other variables in the regression model.
6. Finally, both the length and area of roads show a positive relationship with land prices.

[11] George, Henry (1989), *The Science of Political Economy*, Kegan Paul, Trench Trubner & Co.

Li (1996) suggested that, similar to other regression model, a potential problem of including so many variables is that there may be a relative high correlation among predictor variables such as interest, exchange and deposit rate. However, this research is still relevant to the study on Shanghai's real estate market. The reason is that it is a recent attempt to examine the applicability of various market factors in the determination of urban land price in an Asian context. Besides Taiwan is very closely related to China in both cultural and social context, in addition, both places have strong centralized political power. The only difference is the established market mechanism in Taiwan's land market.

Li (1996) also made a conclusion that market land price behaviour is not a static but dynamic phenomenon. However, some common factors have been shown to be relevant, although to different degrees. This is due to the fact that these tests are carried out in different environment and hence subject to different demand and supply of it.

Li (1996) identified the major factors regarded as relevant to the determination of land price are as follows,

1. Land prices vary inversely with the distance from CBD, but the effect decreases over distance from CBD. In fact such effect is diminishing due to the improvement of transportation network and the development of new trading method, other than traditional physical trading.
2. Population density ceases to be a major positive factor, except in low income and old areas.
3. Land prices are sensitive to the economic potential of a particular growth sector within a city.
4. Macro-economic indicators such as interest rates have became more and more important in determining land prices.
5. Public transport has a certain degree of importance in the Asian setting, but not in the West where private car ownership is high.
6. The racial component of a locality is important to land prices in the West but not in the Asian cites.
7. Amenity effects appear to be important for the determination of urban land prices.

8. Employment opportunities in the neighbourhood are also important to land prices, especially in the Asian setting.
9. Taxation in land has direct and positive effects on land prices.
10. Land use intensity is found to be important and positive.
11. Land use type is also found to be important. This factor can be broken into expected income from land of different land use types, hence, the expected property values and rental values to be received.

To conclude, there is no one particular factor that is significant throughout all studies and applicable universally. In fact some of the findings show contradictory results under different environment. The reason is that the assumptions behind each study varies and result in different findings. Also the same set of assumption working in different time period may have show contradictory result with previous findings. If some of these assumptions are invalid in a new environment, the applicability of these land prices theories becomes questionable. Yet it is worth and necessary the land prices theories at different time and environment for better utilization of the resources in the country.

Chapter 4 Methodology

This chapter gives the methodology used for identifying and analyzing the determinants of land price in Shanghai. Section 3.1 introduces the regression model and the statistical tool for constructing the land price model. Section 3.2 gives a description of the development of the model.

4.1 Regression Analysis

According to Achen (1982), one of the most effective ways to analyze the relationships between land price and a number of proposed explanatory variables is to conduct a regression analysis.

> *"…. … …. … the strength of ordinary regression is its great resilience. As the consistency theorem shows, if the researcher sets up the problem correctly, regression will tend to the right answer under any reasonable practical circumstances, even if a great many of the classical postulates are violated." (P.34)*

On the other hand, M.H. Yates (1965) in his paper examining the spatial distribution of Chicago land price enhanced the importance of the statistical regression model as the major tool in this kind of study.

Since it is the objective of this paper to find the composition of the land price in Shanghai (a planned economy) and compare it with a market economy land. It is therefore logical to implement the regression analysis in first finding the composition and next find the correlation between planned economy land and market economy land

The study will first model the land price in a single-equation econometric function estimated by Ordinary Least Squares (OLS) technique. It is a technique to estimating the unknown parameters in a linear regression model. This method minimizes the sum of squared distances between the observed responses in a set of data, and the fitted responses from the regression model. The function will be estimated from a set of data in way that will minimize the sum of the squared difference between the actual and estimated values. Since there is no prior knowledge on what functional form to adopt, it is assumed to be linear for simplicity, Therefore, the linear equation for land price would be:

$$\text{Accomodation Value} = \alpha_o + \alpha_1 X_1 + \alpha_2 X_2 + \cdots + \alpha_n X_n + \varepsilon$$

Where $X_1, X_2, \ldots X_n$ are the explanatory variables to be tested. α_0 is the constant term. $\alpha_1, \alpha_2, \ldots \alpha_n$ are the partial coefficients to be determined, and ε is the stochastic error term.

In order to understand and interpret the result obtained from the analysis, the following parameter must be studied and understood:

(1)R square and adjusted R square

It indicates the proportion of variation of the land price that can be explained by variation of the independent variables, in other words it indicates how the dependant variable can be explained by the model. Adjusted R square will be interpreted since its value is not affected by the addition of further variables to the model. In other words, the closer its value to one, the better is the model's specification.

However, the R-squared is generally of secondary importance, unless our main concern is using the regression equation to make accurate predictions. The P value or t value tells us how confident you can be that each individual variable has some correlation with the dependent variable, which is the important thing.

(2)T-statistic

It determines whether the variable is a significant determinant of the accommodation value. The greater the t-statistic from the critical value[12], the more significant the variable is in the model. Alternatively, P-value can also be used. The smaller the P value, the more significant the variable is in the model. The t statistic is the coefficient divided by its standard error. The standard error is an estimate of the standard deviation of the coefficient, the amount it varies across cases. It can be thought of as a measure of the precision with which the regression coefficient is measured. If a coefficient is large compared to its standard error, then it is probably different from 0.

(3)Coefficient

It shows the effect of adjusting one unit of the independent variable to the dependent variable, i.e. land price. The sign of the coefficient indicates whether the independent variable is positively or negatively correlated to the dependent variable. The size of the coefficient for each independent variable gives us the size of the effect that variable is

[12] It is determined from the table of t-distribution with reference to the significant level and the degree of freedom. i.e. the number of observation minus the number of independent variable minus one

having on our dependent variable, and the sign on the coefficient (positive or negative) gives us the direction of the effect.

In regression with multiple independent variables, the coefficient tells us how much the dependent variable is expected to increase when that independent variable increases by one, holding all the other independent variables constant.

(4)Statistic Model

In this dissertation, SPSS is used to analysis and run the regression for the land price against the independent variables.

4.2 Development of the model

The data in this dissertation comes from the seasonal published Shanghai land magazine[13]; it provides the information for the transaction price, location, land use, plot ratio and the transaction date of Shanghai land. This gives the source of the dependant variable, i.e. land price. Independent variables such as income, unemployment rate,

[13] 上海土地

gross domestic product and etc are obtained from the Annual Statistical Year Book of Shanghai[14] published by the China Statistic Press.

In order to facilitate the understanding of the determinants of the land price in Shanghai, the dependant variable, accommodation value will be regressed against a number of independent variables which are suggested by previous research and considered as highly related to the land market. It is the objective that the selected variables would reflect both the supply and demand driver of the land price in Shanghai.

[14] 上海統計年鑑

Chapter 5 Empirical Model

5.1 Introduction

This chapter provides an overview of the empirical model for investigating the major determinants of land price in Shanghai. Section 5.2 will identify the explanatory variables that are hypothesized to influence land price in Shanghai. Section 5.3 will be a detail account of all proposed variables in the model, with reference to past literature and provides a review to the situation in Shanghai. On the other hand, justification of selecting the variables will be given. Section 5.4 will examine the expected effects of the selected explanatory variables on land price. Their expected signs of the studied coefficients will be justified here. Section 5.5 will define the period of study and specify the definitions and sources of the proxy data to be used in the model.

5.2 Model Specifications

Although China is a planned economy, where the central government would decide all the allocation of resources including land, it is still expected that the price of an economy resources will be more or less priced according to the economy's performance. In other words there should be no or minimal difference between the land price composition

in a market planed economy and a government planned economy. Therefore in Shanghai land prices are expected to respond to both demand and supply conditions in the property and land market, the land price is therefore specified as general function of demand and supply as follows:

Accommodation Value = ƒ (Demand, Supply)

In other words, the land price is regressed on a series of both demand-side factors (D_t) and supply-side factors (S_t), i.e.

$$AV = \alpha_0 + \sum_{i=1}^{n} \alpha_1 D_{it} + \sum_{j=n+1}^{m} \alpha_j S_{jt} + \varepsilon_t$$

Where α_0, α_i, α_j are the coefficients to be determined, t represents the current period and ε_t is the current stochastic error term.

The equation concentrates on the economic factors that indicate the demand side and supply side influence on the accommodation value. With specific consideration on location situation in Shanghai, the following table shows the variables in that are studied with respect to the land price in Shanghai.

Table 4. Showing the test model for Shanghai Land Price

Variables in initial model specification	Denoted as	Proxied by
Dependent Variable		
Land Price	AV	Accommodation value
Independent/ explanatory variable		
Demand-side variables		
Gross Domestic Product	GDP	Gross Domestic Product
Income	INCOME	Annual Average Wages
Cost of Capital	ANL INTR	1 Year Loan Interest Rate
Stock Market Performance	VOL TRD	Total Vol. of security trading in SH
Unemployment Rate	UNEMP	Registered Unemployment Rate
Population Density	POPU DEN	Population Density
Construction Cost	ACC	Average Construction Cost
Transportation network	PAV ROAD	Length of Paved Road
Supply side variable		
Supply of Property	FSBC	Floor Space of Building Completed

Other Related Variables		
Time	YEAR	Year of Sale
Term	TERM	Term of land use right
Land use Dummy		
Residential	RES	Residential
Commercial	COM	Commercial
Industrial	IND	Industrial
Mixed	MIX	Mixed
Others	OTH	Others

Location Dummy		
Baoshan	BS	Baoshan
Changning	CHANG	Changning
Chongming	CHONG	Chongming
Fengxian	FENG	Fengxian
Hongkou	HONG	Hongkou
Huangpu	HP	Huangpu
Jiading	JIA	Jiading
Jing’an	JING	Jing’an
Jinshan	JINS	Jinshan
Luwan	LW	Luwan
Minhang	MH	Minhang
Pudong New Area	PNA	Pudong New Area
Putuo	PT	Putuo
Qingpu	QP	Qingpu
Songjiang	SJ	Songjiang
Xuhui	XH	Xuhui
Yangpu	YP	Yangpu
Zhabei	ZB	Zhabei

In order to increase the explanatory power of the regression model and remove the effect of different numeric base of the specified variables, double-log regression model is used. Under the double-log regression system, the individual regression coefficient can be interpreted as elasticity. Since regression coefficients are constant, a double-log equation is able to meet the requirement of a constant elasticity; also it is able to show the percentage change of the function. In the logarithmic specification, variables are expected to add a percentage, either constant or multiplicative to accommodation value and the slopes are no longer constant. Therefore both sides of the equation, explanatory side and explaining side are logged.

Dummy variables such as land use dummies and location dummies which can take on the value of zero are not logged but still can be used in the double logged equation. In addition, the time variable will not be logged.

The equation is finalized as follows,

$$\mathbf{LOG(AV)} =$$

$$\boldsymbol{\alpha_0} + \mathbf{LOG(GDP)} + \mathbf{LOG(INCOME)} + \mathbf{LOG(ANL\ INTR)} +$$

$$\mathbf{LOG(VOL\ TRD)} + \mathbf{LOG(UNEMP)} + \mathbf{LOG(POPU\ DEN)} +$$

$$\mathbf{LOG(ACC)} + \mathbf{LOG(PAV\ ROAD)} + \mathbf{LOG(FSBC)} + \mathbf{LOG(YEAR)} +$$

$$\mathbf{LOG(TERM)} + \mathbf{RES} + \mathbf{COM} + \mathbf{IND} + \mathbf{MIX} + \mathbf{OTH} + \mathbf{BS} + \mathbf{CHANG} +$$

$\mathbf{CHONG}$+FENG+HONG+HP+JIA+JING+JINS+LW+MH+PNA+PT+QP+SJ+XH

+YP+ZB+$\boldsymbol{\varepsilon_0}$

Where $\boldsymbol{\varepsilon_0}$ is the stochastic error term of the estimate model.

5.3 Investigations of variable for regression

This section provides an explanation on the variables selected and the rationale behind for selecting the variable in the regression model. Calculation and the source of the variable are provided. Justification is made with references to past literatures and local situations in Shanghai. Furthermore, the general conditions and trends in Shanghai are reviewed.

5.3.1 Dependent Variable

In this regression model the dependent variable selected is the Accommodation Value. AV is calculated by dividing the total land price by the total floor area (GFA) allowed on site. Through this calculation of the AV, effect of plot ratio on land price is taken into account, thus plot ratio is not included as independent variable in this care. Accommodation Value is selected as dependent variable due to conventional practice on studies in relation to land price. According to Jud (1980) suggested that unit land price based on per square foot of floor appears to be more consistent.

$$AV = \frac{Total\ Market\ Price\ for\ Land\ Use\ Right}{Gross\ Floor\ Area}$$

5.3.2 Independent Variables

Gross Domestic Product (GDP)

Gross Domestic Product (GDP)[15] is a commonly accepted indicator for measuring a country's overall economic performance. It is the market value of all final goods and services made within the borders of a country in a year. It is often positively correlated with the standard of living[16]. Therefore it is often regarded as the most comprehensive measure of the aggregate economic activity because it compiled from the consumption and expenditure activities of a place.

According to Key et al. (1994),

> "Economic cycles are by convention defined by fluctuations in the GDP growth rate, either absolute fluctuation in growth, or in the growth rate around an underlying trend or in the level of GDP against the productive capacity of the economy."

Also, GDP is frequently employed in previous macroeconomic property price determinants. For example, in the studies by Hui and Lui (2002) and Han et al. (1992), GDP is employed in the model to act as an economic indicator. It is also used as a proxy of household income, since that an increase in GDP signifies improvement in wealth and

[15] 3 methods of calculation: 1. Output (product) Approach; 2. Income Approach; 3. Expenditure Approach. In principle, all method should give the same result.

[16] Generally measured by standards such as real (inflation adjusted) income per person and poverty rate. Other measures such as access and quality of health care, income growth inequality and educational standard are also used.

hence income level of local people. These will enhance the demand for property and hence the demand for land. On the other hand, GDP, cover the gross value of investment expenditure on building and construction and costs of the property and land, it can therefore reflect the territory's demand for real estate and land. Thus GDP is expected to have positive influence on land price.

Fig. 5. Graph showing the annual GDP of Shanghai

Income

This is given by the Annual Average Wages of Staff and Workers. It is the average wage in money terms per person during a certain period of time for staff and workers in enterprises, institutions and government agencies which reflects the general level of wage income during a certain period of time. Here the time taken is on an annual basis.

The formula can be represented as follows,

$$\text{Annual Average Wages for Staff and Workers} = \frac{\text{Total Wages of Staff and Workers per Annual}}{\text{Average Number of Staff and Workers in that year}}$$

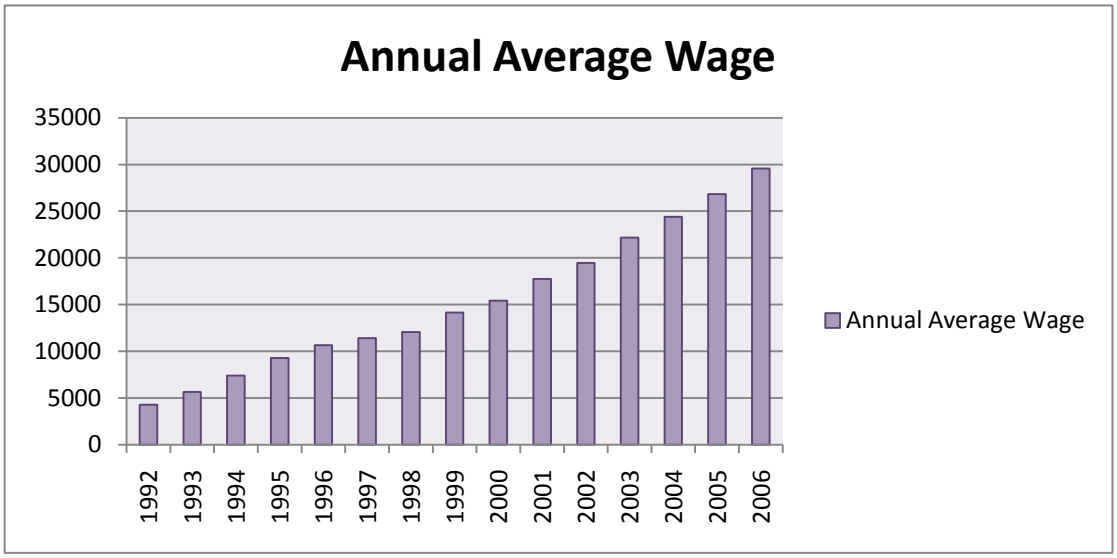


Fig. 6. Graph showing the Annual Average Wages in Shanghai

According to Lau (2006), the level of income reflects the purchasing power and pattern of expenditure of an individual. This directly affects

the demand of the money spender to the property. According to studies conducted by Fair (1972) and Swan (1984), it is found that at macro-economic level, the aggregate income determines the people's aggregate purchasing power and hence the demand for property. It is expected that income should have positive relationship with the demand of land, hence the price of land.

Cost of Capital

This is proxied by the 1 year loan interest rate. Since in most of the case investment is done either by owner's capital or through borrowing, the cost of borrowing directly affects the incentive for investor to borrow money to invest in projects hence the demand for the development of land. Thus it is expected to have a negative relationship with land price. This is supported by Berkman (1979), when the interest rates increases, will result in a decline in the demand for houses due to the fall of consumer's ability to afford financing and causing the attractiveness of housing investment to decrease. Here the loan interest rate is given by the official statistic department as reference.

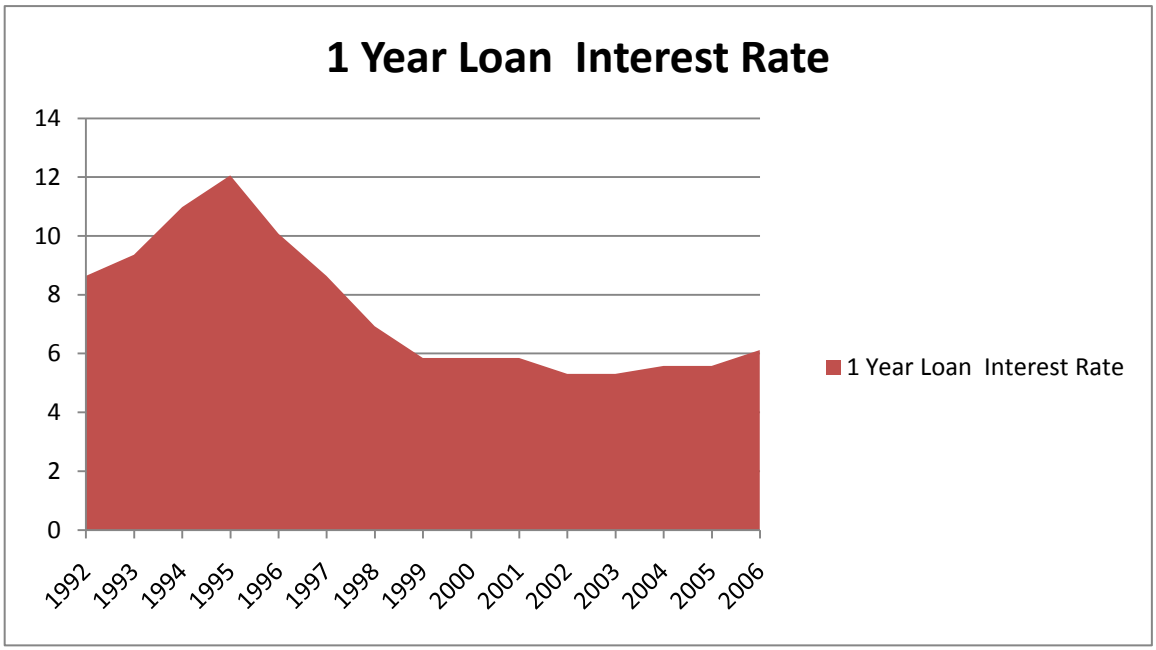


Fig. 7. Graph showing the 1 Year Loan Interest Rates in Shanghai

Stock Market Performance

This is proxied by the Volume of Priced Security Trading in the Shanghai stock market, which includes the total sum of stock, fund and bond trading in the market. The greater the volume of Security being traded, the better prospect is the market expected, hence a better performance of stock within the market. The reason for including this variable is that stock market performance and property price always have shown great correlation, which doesn't only draws money from people's pocket to invest but would also affect the mode of investment in a particular market. This results in affecting the demand for stock and

property hence affects the land price of the market. This was supported by Han et al. (1992) where, the stock market performance was used as an economic indicator to land price.

Moreover, being the financial centre of China, there should be no doubt that Shanghai's stock market performance will stimulates the prosperity of the Shanghai's economy and hence the demand for land sale in Shanghai. It was supported by Norman (2000) that the contention that share price movement reflects economic conditions. And a better economic conditions would result the increase in investment hence the demand for land, as a result of this it is expected that stock market performance have a positive relationship with the land price.

On the other hand, Evan (2004) suggested that the stock market and land market are not perfectly efficient and the stock market cannot fully reflect the changes in the land market which implies that there is a time lag between the information of both market. Therefore the stock market performance is expected to have a lagging relationship with land market performance. In this model the data of the total priced

security trading in Shanghai is lagged 1 year behind the spotted accommodation value.

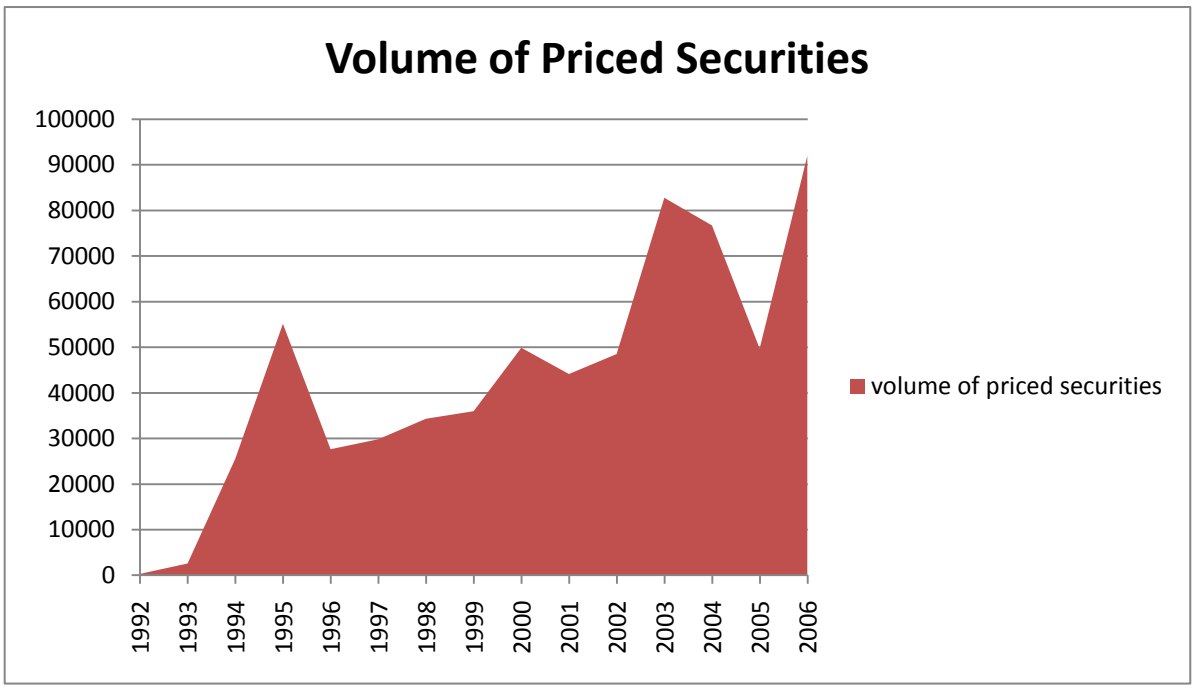


Fig. 8. Graph showing the Volume of Priced Securities trading in Shanghai

Unemployment Rate

It is proxied by the Registered Unemployment Rate in Shanghai. It is the ratio of the number of the registered unemployed to the sum of the number of persons employed in various units (minus the rural labor force, retirees and foreign employee, including Hong Kong, Macau and Taiwan). The Unemployment rate calculation laid off the workers in urban units, urban self-employed individual and the registered urban unemployed person. The formula is as follows,

Registered Urban Unemployment Rate

Where,

UP = Registered Urban Unemployed Person

A = Number of Person Employed in Urban Units

R = Rural Labor force employed

E = Retirees Employed

F = Hong Kong, Macau, Taiwan and Foreign Employees

L = Laid off Workers

S = Self Employed Individuals in Urban Area

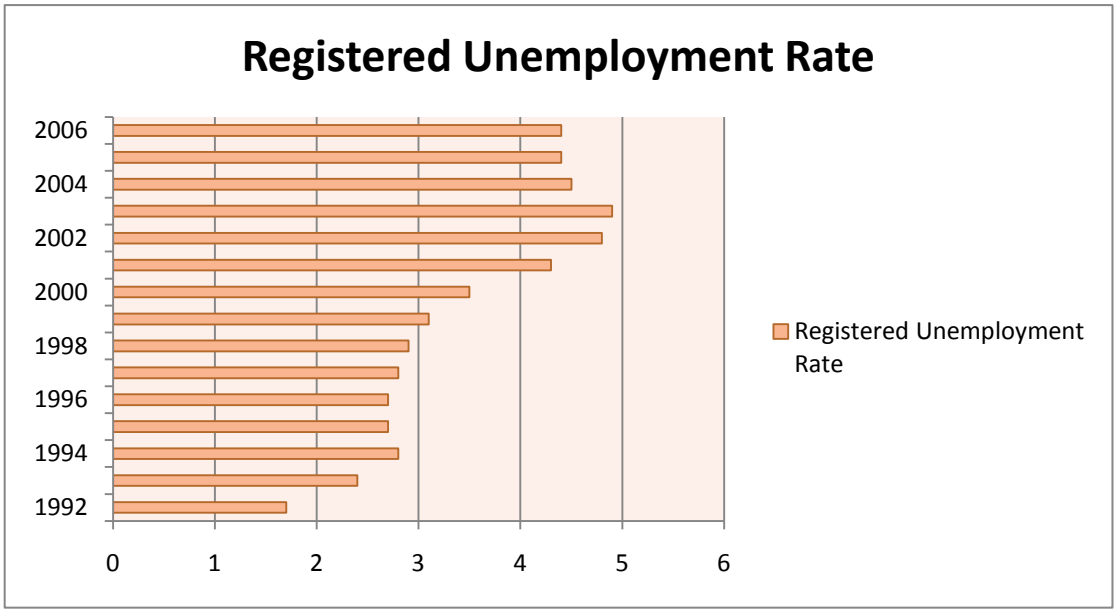


Fig. 9. Graph showing the Registered Unemployment Rate in Shanghai

It is a widely accepted concept that the degree of unemployment rate reflects the stability of the economy within the society. The higher the unemployment rate, the greater the instability of the economy, thus it is often used as an important economic indicator of a territory. This is supported by Brooks and Tsolacos (1999) and Lam (2002), in their studies, employment rate was used to measure the general economic conditions. In addition, investor often perceive high employment rate or low unemployment rate as an indicator of good economy and hence would have higher intention to invest in property. As a result of this, the unemployment rate is expected to possess a negative relationship with the land price. In other words the higher the unemployment rate, the lower should be the property price and hence lower land price.

Population Density

According to the statistical record in Shanghai, the population in Shanghai is calculated by December 31 every year. It is calculated either by (1) the population registered residence and (2) population with permanent residence. The former one refers to the population with registration in the police while the latter refers to the population that actually resides in a place (residence) permanently, usually longer than half a year. All data of the population in Shanghai are taken in the Annual year book published by the authorized statistical body.

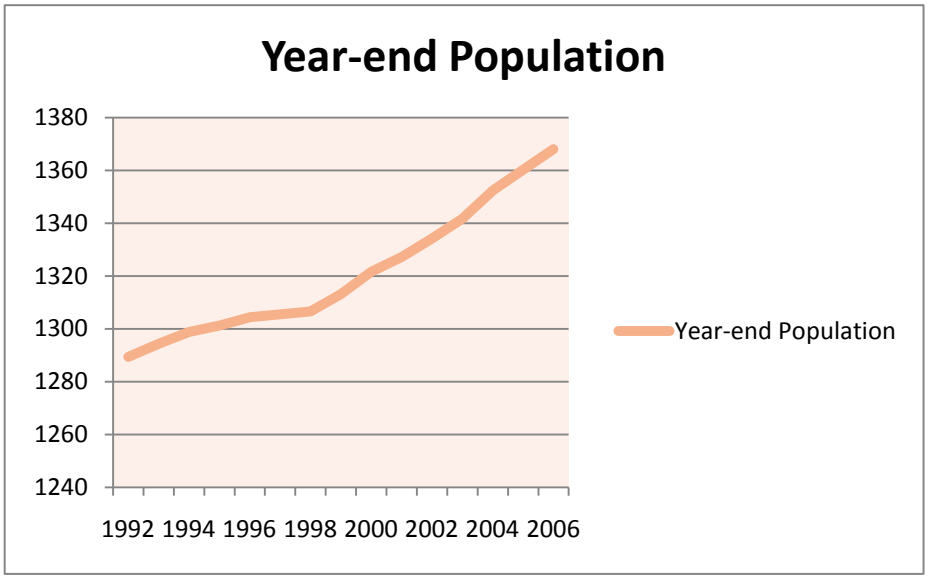


Fig. 10. Graph showing the year-end population in Shanghai

Population density on the other hand is calculated by dividing the total population by the total built area supplied at the end of each year surveyed. It is used as a variable here by considering studies made by scholars in the same area of study. In general it is expected that the higher the population density, the higher should be the price of the land.

Besides, according to Shoshany and Goldshleger (2002), there is an excess of more than 50% in the growth of built-up and infrastructure area as population increases. Therefore it is expected that the higher the population density, the higher the demand for land for development, hence higher is the price of land.

On the hand, Peng and Wheaton (1994) stated the close relationship between private residential property price and population. People tend to fulfill their housing need in private sector once they are capable of doing so. Thus demand for property increases as population increases.

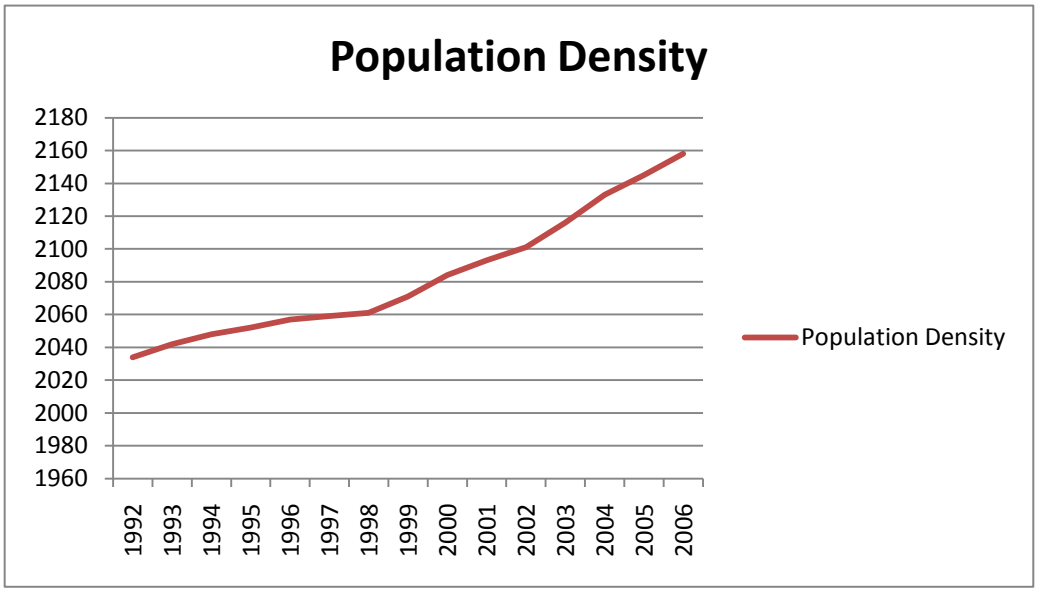


Fig. 11. Graph showing the population density in Shanghai

In this model, population density is expected to possess a positive relationship with the accommodation value in Shanghai.

Construction Cost

It is calculated by taking the average of the average construction cost in yuan per square meter in Residence, Villas and Apartment, Office Building, Commercial Buildings and other Building construction work provided by major contractors in Shanghai.

Cost of construction is included in this model due to the fact that the higher the cost of construction, the higher would be the cost of investment for developers to invest in property and hence lower incentive to invest in property as a result lower demand for land and lower price is expected.

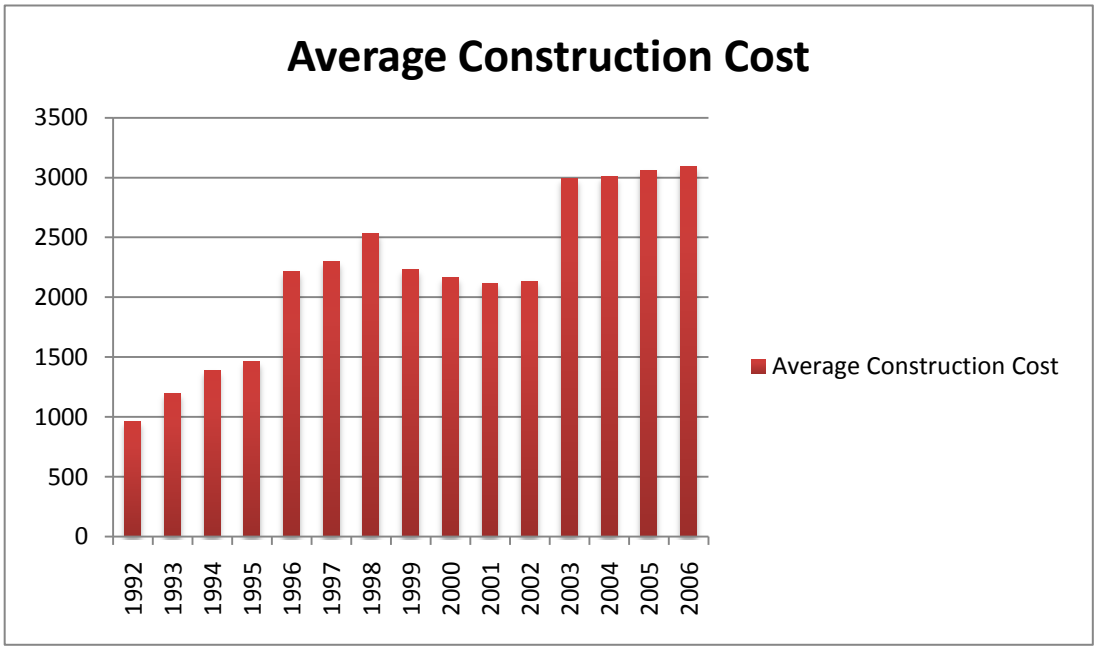


Fig. 12. Graph showing the Average Construction Cost in Shanghai

Transportation Network

This is given by the length of roads and of bridges and tunnels connected to the roads and calculated by the center line of the road. As suggested by Han et al. (1992) length of road is included in his model. Here the length of the paved road is used to reflect the investment of the government of the infrastructure in the city. This indirectly reflects the degree of support from the government on the development of land. Hence it is expected to possess a positive relationship with the land price.

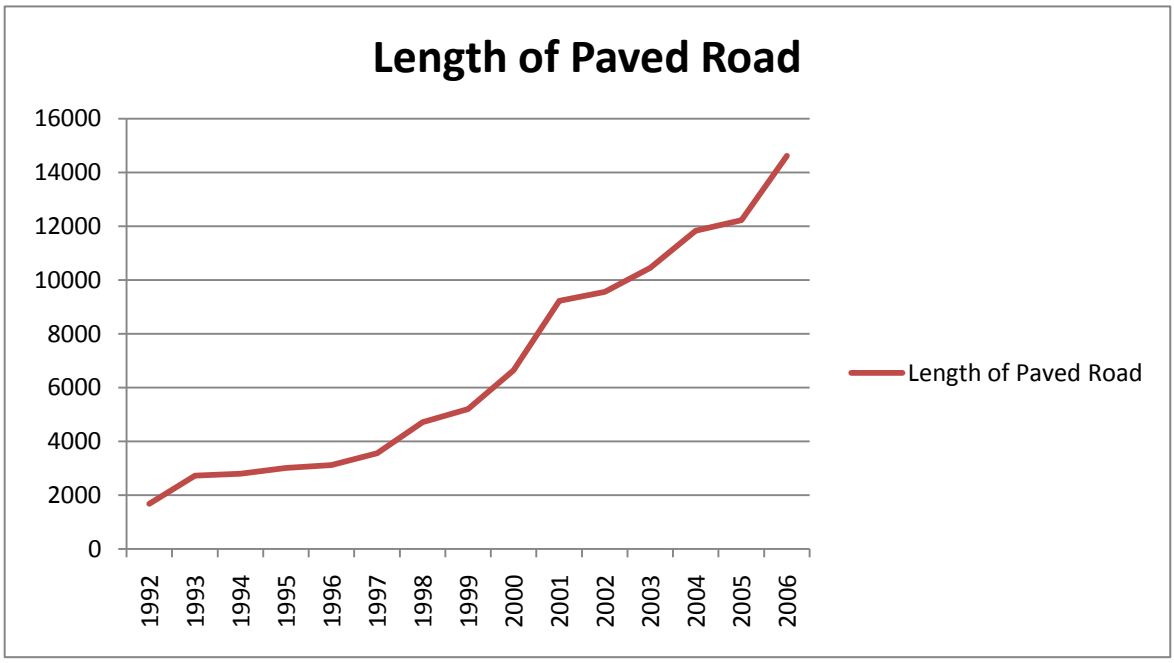


Fig. 13. Graph showing the Length of Paved Road in Shanghai

Supply of Property

This is proxied by the Floor Space of Building Completed, where it is the floor space of buildings that are completed in the reference period in accordance with the requirement of the design that is up to standard for putting them into use and have been checked and accepted by concerned departments as qualified ones.

According to the study conducted by Tse (1998), the higher the property supply, the lower the property price and hence lower the residual land prices. In other words, the new usable floor completed at a certain time will affect the price of land. This is due to the fact that when there is a sufficient supply of property units, developers and investors demand for land will decrease hence the price of land is unlikely to bid up. Tse further suggested that there is a time delay for land price to response to the change in supply because of the imperfect information between the property and land market.

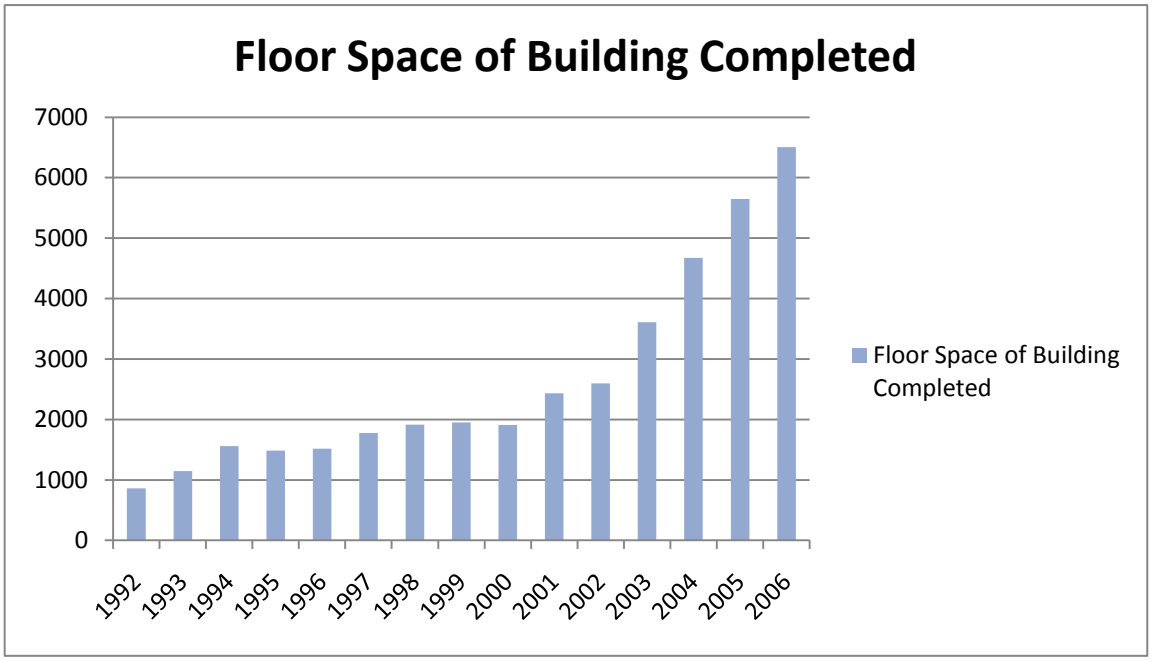


Fig. 14. Graph showing the Floor Space of Building Completed in Shanghai

In this model, the supply of property denoted by the floor space of building completed is lagged 1 year against the regression with the accommodation value.

Time

This simply indicated by the year of the land sale.

Term of year

The right granted to the land purchaser to use the land in terms of years. Normally, land use right granted to different land use have different period of length, for example a typical residential land use right is 70 years while for an industrial land use right is 50 years.

Land Use Dummy

Land use variables are identified as Residential, Commercial, Industrial and Mixed land use. This is to absorb the effect of land sale for different land use. This provides a mean to find out the land use that is most expensive in Shanghai, hence is capable of identifying the greatest demand for land use in Shanghai.

Location Dummy

Although location variable is not studied in this dissertation due to the unique characteristic of the Shanghai Land market, where each district is large enough to have its own Central Business District, say the Pudong New District and the Huangpu district. As a result of this, the common variable used in past literature distance from CBD is removed.

Yet it is still necessary to include dummy variables to remove the effect of land sale in different district. Here, a total of 18 dummy variables are included representing different district of land sale in Shanghai.

5.4 Expected Signs of Coefficients of Independent Variables

Variables in initial model specification	Denoted as	Proxied by	Expected Signs
Dependent Variable			
Land Price	AV	Accommodation value	N.A.
Independent/ explanatory variable			
Demand-side variables			
Gross Domestic Product	GDP	Gross Domestic Product	+
Income	INCOME	Annual Average Wages	+
Cost of Capital	ANL INTR	1 Year Loan Interest Rate	-
Stock Market Performance	VOL TRD	Total Vol. of security trading in SH	+
Unemployment Rate	UNEMP	Registered Unemployment Rate	-
Population Density	POPU DEN	Population Density	+
Construction Cost	ACC	Average Construction Cost	-
Transportation network	PAV ROAD	Length of Paved Road	+
Supply side variable			
Supply of Property	FSBC	Floor Space of Building Completed	-
Other Related Variables			
Time	YEAR	Year of Sale	+
Term	TERM	Term of land use right	+
Land use Dummy			
Residential	RES	Residential	+
Commercial	COM	Commercial	+
Industrial	IND	Industrial	+
Mixed	MIX	Mixed	+
Others	OTH	Other	+

Location Dummy			Expected Signs
Baoshan	BS	Baoshan	+
Changning	CHANG	Changning	+
Chongming	CHONG	Chongming	+
Fengxian	FENG	Fengxian	+
Hongkou	HONG	Hongkou	+
Huangpu	HP	Huangpu	+
Jiading	JIA	Jiading	+
Jing’an	JING	Jing’an	+
Jinshan	JINS	Jinshan	+
Luwan	LW	Luwan	+
Minhang	MH	Minhang	+
Pudong New Area	PNA	Pudong New Area	+
Putuo	PT	Putuo	+
Qingpu	QP	Qingpu	+
Songjiang	SJ	Songjiang	+
Xuhui	XH	Xuhui	+
Yangpu	YP	Yangpu	+
Zhabei	ZB	Zhabei	+

Table 5. Showing the Expected Sign of the Model

5.5 Data Specification

The records of Shanghai's land prices of this research were quoted from the published book "Privatization of Urban Land in Shanghai" By Li (1996), for the period between 1988 to 1992 and an official magazine Shanghai Real Estate Market[17], for the period between 1992 to 2006. Total land sale record of 9219 was collected between 1992 to 2006.

Year	Number of Land Sale
1992	98
1993	182
1994	334
1995	230
1996	226
1997	185
1998	119
1999	143
2000	223
2001	275
2002	1342
2003	1435
2004	1692
2005	1391
2006	1475

Table 6. Showing the land sale record form 1992-2006

[17] Published by the Office of the Shanghai Municipal Committee for Land Use System Reform of the Shanghai State Land Administration Bureau; Municipal Statistical Bureau of the Shanghai and the China Statistical Publishing House.

All the other Independent variables are collected in the Annual Statistical Year Book of Shanghai published by the China Statistic Press which is recognized by the state. Therefore the data obtain should be free of default.

Certain adjustments on the land sale price obtained are made. Since some of the prices obtained from the Shanghai Land Magazine are in USD, they are transformed into RMB to give a comparable base with a proper exchange rate obtained from a historical exchange rate data base (refer to appendix 1 for reference).

Chapter 6 Empirical Results and Analysis

6.1 Introduction

This section is to provide an empirical study on the result of the model obtained from the data. Relationship and the significance of each variable will be discussed. After analyzing the data with SPSS, the following equation simulates the model of accommodation value (land price) in Shanghai.

$$\mathbf{LOG(AV)} =$$

$$\boldsymbol{\alpha_0} + * \mathbf{LOG(GDP)} + \mathbf{LOG(INCOME)} + \mathbf{LOG(ANL\ INTR)} + *$$

$$\mathbf{LOG(VOL\ TRD)} + \mathbf{LOG(UNEMP)} + \mathbf{LOG(POPU\ DEN)} +$$

$$\mathbf{LOG(ACC)} + \mathbf{LOG(PAV\ ROAD)} + \mathbf{LOG(YEAR)} + \mathbf{LOG(TERM)} +$$

$$\mathbf{RES} + \mathbf{IND} + \mathbf{OTH} + \mathbf{CHAN}$$ +FENG+HONG+HP+JIA+JING+JINS+LW

+PT+QP+SJ+XH+YP+ZB+PNA+$\boldsymbol{\varepsilon_0}$

Where $\boldsymbol{\varepsilon_0}$ is the stochastic error term of the estimate model.

* Items are lagged 1 year.

6.2 Empirical Results

Model Summary			
R-square	0.574		
Adjusted R-square	0.573		
Std. Error of the Estimate	0.41404		
No. of Observations	9219		
Insignificant variables	COM; MIX; BS; CHONG; MH;PNA		
No. of Significant variables	28 (excluding constant term)		
Significant variables	Partial Coefficient	t-statistics	Significance
(Constant)	27812.642	18.620	0.000
LOG(GDP)(lagged 1 year)	12.486	19.811	0.000
LOG(INCOME)	9.807	7.279	0.000
LOG(ANL INTR)	-3.600	-9.520	0.000
LOG(VOL TRD) (lagged 1 year)	-0.779	-11.758	0.000
LOG(UNEMP)	-3.878	-10.44	0.000
LOG(POPU DEN)	292.139	18.057	0.000
LOG(ACC)	0.463	2.629	0.009
LOG(PAV ROAD)	3.663	13.517	0.000
LOG(FSBC) (lagged 1 year)	-2.878	-9.737	0.000
LOG(YEAR)	8.342	10.782	0.000
LOG(TERM)	1.301	15.648	0.000

Land use dummy variables	Partial Coefficient	t-statistics	Significance
RES	0.166	6.352	0.000
IND	-0.578	-43.106	0.000
OTH	-0.276	-11.527	0.000
Location dummy variables	Partial Coefficient	t-statistics	Significance
CHANG	0.325	11.418	0.000
FENG	-0.219	-11.821	0.000
HONG	0.225	6.447	0.000
HP	0.486	12.982	0.000
JIA	-0.960	-5.566	0.000
JING	0.207	4.452	0.000
JINS	-0.161	-7.993	0.000
LW	0.427	8.134	0.000
PT	0.183	5.051	0.000
QP	-0.148	-10.546	0.000
SJ	-0.254	-19.684	0.000
XH	0.337	12.607	0.000
YP	0.223	5.616	0.000
ZB	0.150	3.229	0.001

Table 7. Showing result of Regression using SPSS

6.3 Investigations of variable for regression

6.3.1 Insignificant variables

COM
MIX
BS
CHONG
MH
PNA

The insignificant variables obtained in this model consist of 2 land use variables and 4 location variables. This reflects that the land use actually doesn't possess significant effect on the determination of land price in Shanghai. On the other hand, the excluded location variables are probably too far away and possess too many variations in price of the land sale. This is probably due to the reason suggested before that some of the districts in Shanghai are large enough to have its own CBD and discrimination of land price in its area. Thus they are removed in the model which is targeted for the general land price determinant in Shanghai.

6.3.2 Significant variables

(Constant)
LOG(GDP)(lagged 1 year)
LOG(INCOME)
LOG(ANL INTR)
LOG(VOL TRD) (lagged 1 year)
LOG(UNEMP)
LOG(POPU DEN)
LOG(ACC)
LOG(PAV ROAD)
LOG(FSBC) (lagged 1 year)
LOG(YEAR)
LOG(TERM)

GDP

In the model annual GDP is lagged 1 year to build the model. The reason is that people only know what happened in the previous year and normally will use it as a basis to forecast the future. This shows whether people are pessimistic or optimistic in this year's bidding. Hence it will be noticed in the change of land sale in that year. Here, LOG(AV) has a Partial Coefficient of 12.486 indicating that it has a positive impact on accommodation value. This shows that land price in Shanghai is closely related to the trend of the general economic performance as measured by the GDP. Its relatively high coefficient indicates that a small change in the GDP would result in a significant change in the accommodation value of land in Shanghai.

Income

LOG(INCOME) has a partial coefficient 9.807 with the accommodation value. This indicates that income is positively correlated to land price. Its high correlation shows that people spend most of their income on investment in property hence derive a demand for land as a result increase in land price. Like many traditional Chinese cities where people invest their money on property to secure their wealth. This could be fully reflected in the result from the study as the coefficient is relatively quite high. Hence we can conclude that Shanghai's land price is directly affected by people's income in that particular year.

Annual Interest Rate

In this model, the annual interest rate is used to proxy the cost of capital for investment. In the result LOG(AV) is negatively correlated to LOG(ANL INTR) with a partial coefficient of -3.600. This shows that the higher the interest rate on the loan, less encouragement will be given to investment, hence less demand for land for development as a result land price decreases. Its relatively high coefficient shows that most of the investment capital comes from loan or through borrowing, as a

result, the higher the cost of capital, the lower the incentive for people to invest, hence lower the land price. This result reveals that people's investment is one of the major driving sources of demand for land, typical market economy situation.

Volume of Priced Security Trading

This is used to proxy the performance of the stock market, where the greater the number to volume security traded reflects a more prosperous economy in Shanghai. However the coefficient of the LOG(VOL TRD) is -0.779, indicating that the time lag between the stock market performance and land market performance due to imperfect information is not one year. In fact the volume of priced security trading is regressed with LOG(AV) without time lag in a trail and the partial coefficient is found to be 0.38. This result indicates that the time lag between the stock market performance and land market performance should be less than one year.

Unemployment Rate

The partial coefficient of LOG(UNEMP) -3.878. A high unemployment rate reflects the instability of the economy which discourages investments and hence lower demand for land for economic activities. This indicates that demand of land in Shanghai is affected by the stability of the general economic situation. Its relatively high partial coefficient indicates that a small change in the unemployment rate would cause a significant change in the AV in Shanghai.

Population Density

Population density is calculated by the total population in Shanghai divided by the built area completed in that year. In this model it showed a positive partial coefficient of 292.139 with LOG(AV). This indicates that a high population density results in a higher price. Its relatively high coefficient indicates that a lot of land in Shanghai is still underdeveloped, where the coefficient should be expected to be low in well developed cities, Li (1996).

Average Construction Cost

This variable is positively correlated to LOG(AV)with a partial coefficient of 0.463. This is different from what is expected by past scholars as stated previously. This reason is probably due to the imperfect information between the land market and the construction market. However, the length of the time lag is not studied in this dissertation due to limited resources. Yet, the coefficient of the LOG(ACC) indicates that there exists certain relationship between the land price and the construction cost.

Length of Paved Road

This variable is used to reflect the transportation network in Shanghai in affect with the land price. In fact similar variable was used by Han et al. (1992) as length of road. Its partial coefficient in this model is 3.663. The positive figure indicates that, more roads being build, the higher is the accommodation value. This is probably due to the fact that more infrastructures in the society indicate more demand and support of economic activities and hence more demand for land. As a result of such investment, land price is driven up accordingly.

Floor Space of Building Completed

The supply of property denoted by the floor space of building completed is lagged 1 year in the regression model. It shows a negative partial coefficient of -2.878 with LOG(AV). This indicates that supply of property does possess a negative effect to the land price. In other words, the greater the supply of properties, the lower will be the land price. This result complies with the study of Tse (1998), the higher the property supply, the lower the property price and hence lower the residual land prices. However its effect on land price is not very significant, it still can suggest that land prices are primarily demand-determined. However the actual time lag between the supply of the property and the price movement as suggested by Tse is not examined here.

Term

The partial coefficient of LOG(TERM) with LOG(AV) is 1.301, indicating a positive relationship. However, the effect is not significant when compared to other variables. The positive coefficient here coincides with what have been found for industrial land use. Since Industrial land

use usually has shorter term, the negative partial coefficient of the industrial land use does prove that shorter terms of use and hence lower in value of land.

Land Use

Commercial and Mixed land used are proved to be insignificant to the land price and the only significant land uses are Residential, Industrial and Others. Where their partial coefficient are 0.166, -0.578 and -0.276 respectively, this indicates that the industrial land use is the most significant to the land price in Shanghai. However an increase in industrial investment would lead to a decrease in land price. On the other hand, land price would increase when expectation from developers and investor on residential housing is high, yet the change in land price is not very significant. This can reflect that the increase in land prices in Shanghai is regardless of the land use but the investor's expectation of the Shanghai economy in the future.

Location

Location Dummy is included in the model to identify the land sale location in Shanghai. Due to the fact that land area of Shanghai is very large and there is no a clear cut of the central business district. Multiple central business districts can be found in Shanghai. Taking Pudong New Area as an example, it has its own business centre and trading facilities, yet there is also another business area in the Huangpu district. Therefore the effect of distance from CBD as suggested by past scholars cannot be tested in Shanghai.

The sign of the variables here however are not all the same, this is probably due to the fact that each district has their own characteristics and land uses. For instant, it was found that industrial land use land in Shanghai has negative impact on the land price. It is logical to say that district with intense development of industrial land should have a negative impact on land price. However the details of this separation of land use in different district is not studied in this dissertation.

Discussion of Findings

The model produced in this study has focused the attributes of Shanghai land price. It has considered both supply-side factors and demand-side factors of land. All together, 10 demand-side factors, 1 supply-side factor, 3 land use dummy and 18 location dummy were used to regress against the accommodation value of Shanghai Land.

All of them are found to be significant except for 2 land use dummy, commercial and mixed land use. Also, 4 location dummy are excluded namely Baoshan, Chongming, Minhang and Pudong New Area.

Among the 10 demand-side variables, Population Density is found to be the most significant and possess the greatest impact on the land price in Shanghai, followed by annual GDP, Income, Transportation Network, Term of Use, Average Construction Cost, Stock Market Performance, Cost of Capital and Unemployment Rate. This reveals that investors and developer put high emphasis on the local demand for property and their affordability of property in Shanghai. This is also able to prove that land price in shanghai is mainly affected by the general economic performance rather than government intervention, which is proxied by the transportation network in Shanghai.

On the other hand, supply of property which is proxied by the floor space building completed shows a negative relationship with land price. This is logical as more property available in the market, the demand for property hence would decrease, as a result developers and investor wouldn't bid up the land price due to speculation activities. However, its effect on land price is not very significant, thus it reveals that land price in Shanghai are mainly driven by the demand for it and supply of property only have minimal effect on land price in Shanghai. The is due to the fact that the Chinese government are very keen on preventing over-heated property market which may eventually lead to bubble of the property market and would lead to many unpleasant economic disasters such as over lending of bank and lead to closure of financial institution. At this point, government intervention to the market is capable of stabilizing the market performance and lead to a better base for future development. This complies with the unique characteristic of the market economy in China- Capitalist society with China characteristic

The result explained the drastic increase in land price in Shanghai during the past decade was mainly due to increased in population

density. This was probably due to the intense development of Shanghai and had attracted people from other places in China and overseas to work in Shanghai. It is the fact that many international companies had already set up their branches in Shanghai, especially in the Pudong New Area, a lot of international companies had set up their headquarters there. And such trend will continue as Shanghai is turning into an international financial centre. Besides, Shanghai's general economy performance reflected by GDP also plays an important in determining the increase in Shanghai land price. And hence, the demand side in the market is highly significant. This however is relates to how many more company would start business in Shanghai and hence going back to the first reason that causes land price in Shanghai to increase. The better is the economy; the more company set up business, the higher the population in Shanghai hence the demand for land and property in Shanghai. On the other hand, income is also another important source of bidding the land price up in Shanghai. The higher income people are receiving, the more willing they are to pay for good quality housing located on good quality land and the bid-rent theory applies.

Chapter 7 Conclusion

This study is aimed to provide a foundation for future researcher to study the details of the attributes in land price in China and eventually help scholars to develop theory of land in China with its unique market. Shanghai is selected as it is one of the earliest developed cities in China. The study has shown that Shanghai's land price does possess certain attributes similar to those in a market economy, but it is also affected by planned economy factors, such that the effects of government intervention in high land price.

Although modeling land price is not a new area of study, only a few researches have been done in this area in China. Despite the fact that theoretical framework on land price determination are well developed in the western countries, it may not be applicable in China due to its unique characteristic of economy, research in this area have to be studied and justified for land price determination. The R-square obtained in this model is only 0.573, this suggest that land price attribute in Shanghai does not only consist of demand and supply factors. Other factors such as government fiscal policy, international trade and news can be added in the model for future studies.

7.1 Limitation of Study

1. Multi-collinearity

When two or more independent variables in an equation are highly correlated, this would cause the failure of the assumption based on the OLS regression. As a result, the regression model may not be 100% accurate. Since most demand-side variables used in this dissertation are influenced by the overall economic situation, it is normal to expect there exists certain correlation between these variables. However, there is no theoretical guideline on stating the level of correlation that may lead to multi-collinearily. Yet this cannot be solved in this dissertation as when some of the variables removed it resulted in significant change in the adjusted R square of the model.

2. Exchange Rate

Since some of the land transaction price in the Shanghai land magazine are stated in USD, especially for those transactions in the early years, particularly before 1995. These prices have to be translated into RMB to make a fair base for comparison. They are multiplied by a spotted annual exchange rate in the prescribed year, however these rate may

not be the actual rate of exchange at that time the land was sold. This is due to the fact that there wasn't a fixed exchange rate system between USD and RMB. The annual average rate of exchange was used instead the prescribed rate of exchange for the particular date for convenience. As a result the translated land price may actually be higher or lower than the real transaction price in RMB, hence affecting the accuracy of the model. This problem is addressed but not solved in the dissertation.

3. Lack of Data

Since some of the information provided in the Shanghai land magazine on land sale are not complete for example some land sale record did not provide the plot ratio and some didn't put down the land sale price. On the other hand, certain unreasonable land sale records are removed from the data base, with a total around 150 land transaction records were removed from the original total land sale record of 9369. The removed data here is only about 1.6% of the total record of land sale, thus the model should be capable of meeting the objective of this study as the benchmark of the maximum amount of data can be removed is 5% of the total data.

7.2 Further Research Area

This dissertation has established a land pricing model that shows the attributes of land price in Shanghai. Generally, the model shows the macro factors that affects the land price in Shanghai. Based on this foundation, further research can be done in other areas such as,

1. Micro-scale study

Researchers could focus on government policies, built-in environments, town planning and other micro-scale factors that may affect the land price. This could help planners, economics and especially government to set a proper price of the land being auctioned. This is able to enhance a better resources allocation.

2. Detail study on the lagged factors that affects the land price

Several variables in this model are identified to possess certain lagging effect on the land price, however they are not inspected in detail on the actually length of time lag base on the market imperfection. For instant, the floor area completed GDP, if their actually lagging period is found; investors and planner could have a better forecast on their investment.

3. Research for land price attributes in different cities in China

Since the case study in this dissertation is Shanghai, the logic and methodology of this study can be used to study the land price attributes in other cities in China, such as Beijing, Guangzhou and Shenzhen to obtain a better picture of land prices attributes in China. On the other hand, studies on land price attributes in different cities can be compared to find out the unique land price attributes each city possesses. This is worthwhile for studying in terms of planning and land economics in China.

Appendix 1

Year/Rate	1USD=? RMB
1992	5.734
1993	5.776
1994	8.634
1995	8.323
1996	8.350
1997	8.324
1998	8.291
1999	8.278
2000	8.277
2001	8.277
2002	8.277
2003	8.277
2004	8.276
2005	8.277
2006	7.969
2007	7.509
2008	6.830
2009	6.823

Historical Exchange rate between USD and RMB (taken in annual average)

Table 8. Showing the Annual Exchange Rates of USD to RMB

(Information obtained from http://currate.com/historical-exchange-rates.php)

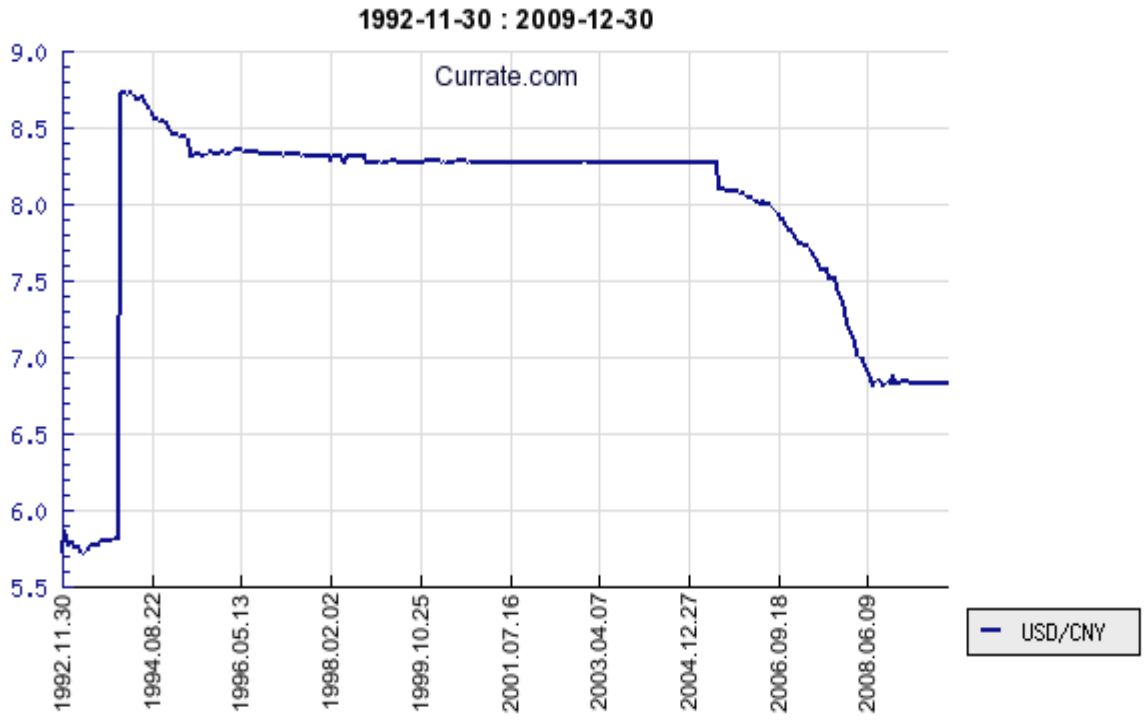


Fig. 15. Showing the change in exchange rate from 1992 to 2008

Bibliography

Ricardo, David (1821), *The Principles of Political Economy and Taxation*, John Murray, Albemarle-Street Third Edition, London, Chap. II

Jud, G. D. (1980), The effects of zoning on single-family residential property values: Charlotte, North Carolina, *Land Econom.* 56, 142-154

Evans, A.W. (1983), *The Determination of the Price of Land*, *Urban Studies*, 20, 119-129, May 1983

Walters, A.A. (1983), The value of land, in Dunkerley, H. B. and Whitehead, C.M. (eds.), Urban Land Policy: Ussues and Opportunities, Oxford University Press

George, Henry (1989), *The Science of Political Economy*, Kegan Paul, Trench Trubner & Co.

Alonso, W. (1960), A Theory of the Urban Land Market, P*apers and Proceedings of the Regional Science Association*, Vol. 6, 1960, pp. 149-157

Alonso, William (1964), *Location and Land Use*, page 21, East-West Centre Press

Fair, R. C. (1972), Disequilibrium in Housing Model, *Journal of Finance,* 27(2), 207-221

McDonald, J. F. & Bowman H. W. (1979), Land Value Functions: A Re-evaluation, *Journal of Urban Economics 6*, 91-104

Berkman, G. Neil. (1980), The New Monetary Aggregates: A critical Appraisal. Journal of Money, Credit and Banking, 12(2), 135-154

Needham, Barrie (1981), 'A Neo-Classical Supply-Based Approach to Land Price', *Urban Studies* (1981) 18, 91-104

Draper, D. W. And Findaly, M. Chapman (1982), 'Capital Asset pricing and Real Estates Valuation' *AREUEA Journal*, Vol. 10, pg. 184-200

Achen, C.H. (1982), Interpreting and Using Regression, Sage Publications, Newbury Park, CA.

Brown, R.L. and Achour, D. (1984), The Pricing of Land Options, *Urban Studies*, Vol.21 pp. 317-324, August 1984

Swan, C. (1984) A model of Rental and Owner-occupied Housing, Urban Studies, 16, 297-316

Titman, S. (1985) Urban Land Prices under Uncertainty, The *American Economic Review* (June 1985) Vol.75, No.3, 505-514.

WS Grigson (1986), House prices in perspective: a review of South East evidence, Seplan

Nuetze, M. (1987), The Supply of Land for a Particular Use, Urban Studies 24, 179-88

Evans, A. (1988) On Absolute Rent, Discussion papers in Urban and Regional Economics, Series C. Vol. 1, No.36: Department of Economics, University of Reading

Evans, A. (1988) On Differential Rent and Landed Property, Discussion papers in Urban and Regional Economics, Series C. Vol. 1, Department of Economics, University of Reading

Geltner, D. (1989) 'On the Use of Financial Option Price Model to Value and Explain Vacant Urban Land', *AREUEA Journal*, Vol. 17, No. 2, 142-158

Wheaton, W.C. (1989) 'Comments On: On the Use of Financial Option Pricing Model to Value and Explain Vacant Urban Land', *AREUEA Journal*, Vol.17, No. 2, 142-158

Bramley, G. (1989). Land Supply, Planning and Private Housebuilding, mimeo, SAUS, University of Bristol

Capozza D.R. and Helsley, R.W. (1989) The Fundamentals of Land Prices and Urban Growth, *Journal of Urban Economics* (1989), 26, 295-306

Capozza D.R. and Schwann, G.M. (1989) The Asset Approach to Pricing Urban Land: Empirical Evidence, *AREUEA*, Vol.17, No. 2, ppI61-175, 1989

Lardy, N.R. (1991), Chinese Economic Reforms in the '90s, Hong Kong: Asia Society, Hong Kong Centre

Harvey, David (1992) *The Urban Experience*, Baltimore: John Hopkins University Press

Han, C. Et al. (1992), *Analysis of the Changes in Urban Land Prices in Taiwan*. National Science Committee, Taiwan (in Chinses)

Key, T., MacGregor, B. Nanthakumaran, N. And Zarkesh, F. (1994), *Understanding the property cycle: economic Cycles and Property Cycles*, London. The Royal Institution of Chartered Surveyors

Walker, A and Li, L.H. (1994), *Land Use Reform and the Real Estate Market in China*, Journal or Real Estate Literature, Vol. 2, pp. 199-211

Peng, R. And Wheaton, C. William (1994), *Effects of restrictive land supply on housing in Hong Kong: An econometric analysis*. Jounal of Housing Research, 5(2), 263-272

Walker, Anthony Chau, Kwong-Wing and Lai, Wai Chung (1995), *Hong Kong in China: Real Estate in the Economy*; Hong Kong: Brooke Hillier Parker

Xu, M and Zhang, X.H. (ed.) (1995), *The History of the Chinese Land Management* (in Chinese), Beijing: China Agricultural Publishing House

Li Ling Hin (1996), *Privatization of Urban Land in Shanghai*, Hong Kong: Hong Kong University Press

Li Ling Hin and Walker, A. (1996) "Benchmark pricing behaviour of land in China", *Journal of Property Research*, Vol. 13 No. 3, pp.183-196

Harvey, J. (1996), Urban Land Economics, Basingstoke: Macmillan

Pang, SY and Wong WK (1997), Government Policies and Private Housing

Prices in Singapore, *Urban Studies Journal*, SAGE

Xing Quan Zhang (1997), Urban Land Reform in China, Department of Environmental Planning, United Kingdom: University of Strathclyde

Tse, R.Y.C. (1998), Housing Price, Land Supply and Revenue from Land Sales. Urban Studies, 35(8), 1377-1392

Li Ling Hin, (1999), *Urban Land Reform in China*, Hong Kong, MaCmillan Press Ltd

Nelson Chan (1999), Land-use rights in Mainland China: Problems and Recommendations for Improvement, *Journal of Real Estate Literature*, Australia: Springer Netherlands

Brooks, C. And Tsolacos, S. (1999), The impact of economic and financial factors on UK property performance. Journal of Property Research, 16(2), 139-152

Norman, f. (2000) Guide to economic indicators. Armonk, N.Y. : M.E. Sharpe. C2000. 3rd edition

Hui, E and Lui, T. Y. (2002), Rational expectations and market fundamentals-evidence from Hong Kong's boom and bust cycles. Journal of Property Investment & Finance

Shoshany, M. Goldshleger, N. (2002), Land use and population changes in Isreal-1950 to 1990: analysis of regional and local trends. Land Use Policy, 19, 123-133

Lam, C. W. (2002), Major factors contributing to the changes in private residential property price in Hong Kong,; Review and forecast. Hong Kong, The University of Hong Kong

Zhang, Jihong (2001), Land Prices in transitional economies, Unpublished PhD thesis , Department of Real Estate and Construction, The University of Hong Kong

Lam, C. W. (2002), Major factors contributing to the changes in private residential property price in Hong Kong; Review and forecast. The University of Hong Kong:

Le-Yin Zhang (2003), Economic Development in Shanghai and the Role of the State, *Urban Studies Journal*, SAGE

Fulongwu (2003), Globalization, Place Promotion and Urban Development in Shanghai, *Journal of Urban Affairs*, Volume 25, Number 1 pages 55-78

Lo (2003), A Critical Examination of the Urban Land Reform in China: An Empirical Analysis of the Land Price Behaviour in Shenzhen

Jack Harvey & Ernie Jowsey (2004), *Urban Land Economics*

Evans, A. W. (2004), *Economics, real estate and the supply of land*. Oxford, UK; Malden, MA:Blackwell Pub

Chengri Ding (2004), Urban Spatial Development in the Land Policy Reform Era: Evidence from Beijing, *Urban Studies*, Volume 41, Number 10, 1889-1907

Wu Hao, REED Richard Yan, ROBINSON Jan (2005), The Role of the State in the 1990s Property Cycle in Hainan, Faculty of Architecture Building and Planning, the University of Melbourne Victoria, Australia 3010

Law, C. Y. (2005), Analyze the residential property price in Hong Kong: Cause and effects. Hong Kong, The University of Hong Kong

Lu Xin-Hai, WANG Yue, SONG Guo-Lin (2005), On the Influence of Land Banking System to the Development of Chinese Real Estate Industry

ZHANG Wei-Wen, DU Xue-Jun (2005), Discussion on the Establishment of Urban Land Market Assessment System in China

YANG Hua-Bang (2005), the Transmission Mechanism of Monetary Policy Can Help Regulate and Control the Real Estate Price of China

GE Sheng-Ping (2005), All Factors Influence on the Real Estate Price

YANG yang (2005), Prospect of China Real Estate Market

Li Ling Hin (2005), *Development Appraisal of Land in Hong Kong*, Hong Kong: Chinese University Press

Lau (2006), A study of factor affecting Land Price in Hong Kong, Unpublished BSc thesis, Department of Real Estate and Construction, The University of Hong Kong

Wu Hao (2007), *Shanghai Real Estate Development Report*, China, Shanghai Communication University Press (in Chinese)

Siqi Zheng, Matthew W. Kahn (2007), Land and Residential Property Markets in a Booming Economy, New Evidence from Beijing

Li Ling Hin (2008), Land Price Changes in the evolving land market in Beijing, Hong Kong, The University of Hong Kong

J. Albert Cao (2008), Developmental state, property-led growth and property investment risks in China, Department of Real Estate and Construction, United Kingdom: Oxford Brookes University, Oxford

Elliott Ng (2008), Links: on RMB appreciation and RM-USD exchange rate, People, Business, and Life in China